

# Proceedings of the International Symposium on Monolingual and Bilingual Speech 2019

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Institute of Monolingual and Bilingual Speech  
Chania, Greece

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EDITOR

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## FOREWORD

The Proceedings contain twenty papers selected from those presented at the International Symposium on Monolingual and Bilingual Speech (ISMBS) 2019 which took place in Chania, Greece on 27-30 August 2019. The Symposium sprang from yearning for a specialized conference on speech that cuts across dividing boundaries between language subfields: first language, second language, bilingual, multilingual; child or adult; typical or impaired. ISMBS encourages investigations that go to the heart of matters, widening existing horizons and perspectives, kindling a holistic viewpoint, fostering collaborations across the board and, ultimately, sparking innovative thought and approaches. Participant affiliations covered thirty two countries in Europe, North and South America, Asia, and Australia. There were thirty eight languages researched in the papers presented. Special issues of the Journal of Monolingual and Bilingual Speech (Equinox Publishing) that include papers presented at ISMBS 2019 are under preparation.

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- |        |                    |    |                        |
|--------|--------------------|----|------------------------|
|        | ‘Push a car!’      |    | ‘Push a vehicle!’      |
| (3) a. | Kuruma-o      osu! | b. | Norimono-o      osu!   |
|        | car      -ACC push |    | vehicle      -ACC push |
|        | ‘Push a car!’      |    | ‘Push a vehicle!’      |

When it comes to entailment, imperatives are upward entailing environment, in parallel with positive assertions. Notice that (a) sentences entail (b) sentences in that if the addressee pushes a car, it means that the addressee pushes a vehicle.

### *Disjunction in simple positive and negative assertions*

To illustrate the behavior of disjunction, consider (4a-c):

- (4) a. Mary bought oranges or bananas.  
 b. Mary-ga      mikan-ka-banana-o      kat-ta      (-koto)  
 Mary-NOM      orange-or-banana-ACC      buy-PAST (-fact)  
 ‘Mary bought oranges or bananas.’  
 c. Mikan-ka-banana-o      kae-ba, medaru-ga      mora-e-ru  
 orange-or-banana-ACC      buy-if      medal -NOM      get-can-PRES  
 ‘If Mary buys oranges or bananas, she can get a medal.’

When (4a) is uttered, the speaker has in mind that Mary did not buy oranges or she did not buy bananas. The same is true for (4b), the Japanese counterpart of (4a). This reading is called ‘exclusive reading.’ No interpretive difference arises between English and Japanese disjunction when it comes to simple positive assertions. Yet, the interpretation available in (4c), where the disjunctive phrase is embedded in the conditional clause, is different from the exclusive interpretation available in (4a, b). In (4c), Mary can get a medal if she buys (i) only oranges and (ii) only bananas. In addition to the situations (i) and (ii), Mary can get a medal if she buys (iii) both oranges and bananas. This reading is called ‘conjunctive reading.’ In short, the disjunctive phrase in (4c) has so called ‘inclusive reading,’ which is the combination of exclusive and conjunctive reading.

Unlike in positive assertions, in negative counterparts, a contrast emerges between English and Japanese, illustrated in the difference between (5a) and (5b):

- (5) a. Mary did not buy oranges or bananas.  
 b. Mary-ga      mikan-ka-banana-o      kawa-nakat-ta      (-koto)  
 Mary-NOM      orange-or-banana-ACC      buy-NEG-PAST (-fact)  
 ‘Mary did not buy oranges or bananas.’

In English, (5a) is ambiguous (e.g. Szabolcsi 2002). This sentence can describe the situation in which Mary did not buy oranges and she also did not buy bananas (NEG > OR). It can also mean that Mary bought either oranges or bananas, but not both (OR > NEG). In contrast, (5b), the Japanese counterpart of (5a), is unambiguous, only allowing the interpretation that Mary bought oranges or she bought bananas (OR > NEG).

### *Disjunction in imperatives: Aloni (2007)*

Turning to disjunction in imperatives, let us consider (6) and (7):

- |     |                         |     |                             |
|-----|-------------------------|-----|-----------------------------|
| (6) | Buy oranges or bananas! | (7) | Mikan-ka-banana-o      kau! |
|     |                         |     | orange-or-banana-ACC buy    |
|     |                         |     | ‘Buy oranges or bananas!’   |

Under Aloni’s (2007) analysis, both (6) and (7) are represented as follows.

- (8) may (buy oranges)  $\wedge$  may (buy bananas)

This representation means that ‘you may put a red ball and you may put a blue ball.’ The representation therefore allows the addressee to buy (i) only oranges, (ii) only bananas, and (iii) buy both oranges and bananas. Importantly and in principle, this indicates that both exclusive and

conjunctive readings are allowed in imperatives. In other words, disjunction permits inclusive reading in imperatives.

### Disjunction in child grammar

As seen above, the behavior of disjunction diverges across languages in negative assertions in adult grammar. In this section, we present another contrast, this time, between adults and children: the behavior of disjunction does not depart across languages in children's grammar, exhibiting interpretation different from any of the interpretations available to adults, described in the previous section.

#### *Disjunction in negative assertions*

Recall that (5b) is unambiguous in adult grammar, with Japanese *ka* necessarily taking scope over negation. In contrast, it is well known that Japanese *ka* can take scope below negation in child grammar (cf. Goro & Akiba, 2004). Therefore, for children, (5b) can mean that Mary bought neither oranges nor bananas. At this point, it is quite tempting to interpret this contrast in terms of scope taking: *ka* is structurally located above negation in adult grammar, whereas it remains inside VP in child grammar.

#### *Singh et al. (2016)*

The difference between children and adults with respect to the interpretation of disjunction is clearer once we shift our attention to positive assertions. Notice that in positive assertions there is no quantificational element like negation for *or* and *ka* to scopally interact with. Therefore, what we see here is arguably not a matter of scope ambiguity. Keeping this in mind, consider (4b), which is repeated in (9):

- (9) Mary-ga mikan-ka-banana-o kat-ta (-koto)  
 Mary-NOM orange-or-banana-ACC buy-PAST(-fact)  
 'Mary bought oranges or bananas.'

For adults, (9) means that Mary bought either oranges or bananas, but not both (exclusive reading). By way of contrast, children interpret (9) as Mary bought both oranges and bananas (conjunctive reading). In short, children interpret disjunction as conjunction.

Singh et al. (2016) account for this interpretive difference between adults and children by adopting the concept of 'alternatives,' which roughly correspond to expressions alternative to X when uttering an expression X. For instance, when adults utter (9), they have 'oranges and bananas' as an alternative to 'oranges or bananas', and they interpret this sentence as 'Mary bought oranges or bananas, but not both.' In the framework that Singh et al. (2016) adopt (cf. Chierchia, 2013), this interpretation is derived by an operator, named 'Exhaustivity operator (Exh),' which negates the alternatives not uttered, in the following way:

- (10)  $\text{Exh}(\text{oranges} \vee \text{bananas}) = (\text{oranges} \vee \text{bananas}) \wedge \text{not}(\text{oranges} \wedge \text{bananas})$

Due to the presence of the Exh, (10) realizes the exclusive reading in (9) in adult grammar.

In contrast, according to Singh et al. (2016), when children utter such sentences, children do not have 'oranges and bananas' as an alternative. Instead, they have the following two alternatives: 'only oranges' and 'only bananas.' Accordingly, children necessarily arrive at the conjunctive interpretation that Mary bought both of them, as illustrated in (11):

- (11)  $\text{Exh} \text{ Exh}(\text{oranges} \vee \text{bananas}) = \text{not}(\text{Exh}(\text{oranges})) \wedge \text{not}(\text{Exh}(\text{bananas}))$   
 = i.e.  $\text{not}(\text{only oranges}) \wedge \text{not}(\text{only bananas})$   
 = i.e.  $(\text{both oranges} \wedge \text{bananas})$

In short, while adults exhaustify disjunction only once, children do it recursively.

#### *Tieu et al. (2017)*

Tieu *et al.* (2017) further conducted experiments on the children's interpretation of disjunction in Japanese and French. The result is consistent with Singh *et al.*'s (2016) proposal because, unlike adults, conjunctive reading was forced by children. Their study confirmed that children interpret disjunction as conjunction cross-linguistically.

### *Summary*

The interpretation of disjunction *ka* in Japanese is different between children and adults in positive as well as negative assertions. Children assign conjunctive reading for *ka* in the context where adults interpret it exclusively. Singh *et al.* (2016) explain this difference by arguing that, adults and children have different alternative sets to calculate the meaning of disjunction.

On this basis and in order to examine whether children aged 4-5 years interpret disjunction conjunctively in any upward entailing environment, we focus on imperatives.

## **Experiment**

We report two experiments related to the interpretation of disjunction in imperatives: Experiment 1 for exclusive interpretation and Experiment 2 for conjunctive interpretation. Accordingly, Experiment 1 focuses on the condition in which one of the disjuncts was manipulated, and Experiment 2 deals with the condition in which both disjuncts were manipulated. This two-step experiment is required since, as discussed above, previous research indicates that in simple positive assertions, children at the age of 4-5 years only accept conjunctive interpretation, so it is desirable to test these two types of interpretation separately.

### *Hypothesis*

We predict that children interpret disjunction in imperatives conjunctively in the same way as in simple positive assertions, given that imperatives are also upward entailing environment.

### *Participants*

A total of 21 child subjects (4;10-6;06, M: 5;09) participated in Experiment 1, whereas eight child subjects (4;11-6;00, M: 5;02) joined Experiment 2. In both experiments, 16 adult subjects served as a baseline against which the child results are compared.

### *Stimuli*

Experiments 1 and 2 consisted of 14 and 16 stimuli, respectively, including five sentence types where two sentence types matched the current study: positive and negative imperatives with the disjunction *ka*, four tokens each in Experiment 1 and five tokens each in Experiment 2. Four sentences out of eight and four sentences out of ten were relevant for the current study in Experiment 1 and 2, respectively. A sample test item is given in (12):

- (12) Aka-ka-ao-o        ireru/ire-nai!  
 red-or-blue-ACC    put in/put in-NEG  
 '(Do not) put a red or blue (ball) there.'

### *Procedures*

One of the experiment examiners manipulated a monkey puppet, showing up in a plot. The plot was created on a PowerPoint presentation, which proceeded moving from one slide to the next on the computer display, set between participant and examiner. Another experiment examiner sat behind the participant and held a remote control to determine the next slide time movement, taking a note of the participant's responses, as well as his comments worthy of recording.

The experiment followed the following steps. First, the frog, showing up in the computer display, moves one ball into the white box, and then asks the monkey to put a ball or balls into the red box in

front of him, by uttering one of the test sentences or fillers. Listening to the utterance, coming out of the computer speaker, the monkey put a ball or balls into the box in front of the participants. Then, considering the frog's utterance and the colors of the balls the monkey moved, the participants then judge whether the monkey correctly moved the ball(s) or not, by raising a handheld 'correct' or 'incorrect' sign. Lastly, when the participant responses are negative, the experimenter, who manipulates the puppet, asks participants what was wrong with the monkey's reaction to what the frog said.

The following is one of the actual test items for conjunctive reading. The dialogue is translated into English here for convenience.



Frog: I will put a ball into the white box first. (putting a yellow ball there)  
 Now, it's your turn, Monkey. Please put a ball from the white box into the red one. **Put a red ball or a blue ball there.** Okay?  
 Monkey: Okay! (putting a red ball into the red box)  
 Experimenter: Did the monkey correctly move the ball?  
 Participants: (The expected answer) No.

## Results

The current study found that, as adults, Japanese children aged 4-5 years interpret disjunction inclusively in imperatives. The overall judgments of the adult control group are as expected.

The children's results of Experiment 1 are summarized in Table 1.

**Table 1. Children's results of Experiment 1**

	Positive Imperative	Negative Imperative
Accepted	95.12% (39/41)	2.38% (1/42)
Rejected	4.88% (2/41)	97.62% (41/42)

The Experiment 2 results are given in Table 2.

**Table 2. Children's results of Experiment 2**

	Positive Imperative	Negative Imperative
Accepted	100% (16/16)	12.5% (2/16)
Rejected	0% (0/16)	87.5% (14/16)

The results from Experiment 1 suggest that exclusive reading is available for children in imperatives. In addition, the results from Experiment 2 show that conjunctive reading is also available. These two sets of results indicate that children aged 4-5 years permit inclusive reading for disjunction *ka* in imperatives.

We observed no statistically significant difference between the child participants and the adult control group in either experiment. This indicates that, with regard to imperatives, children and adults behave similarly. This result appears surprising, given the finding in the above-mentioned previous research that children at this age assign conjunctive reading for *ka* in simple positive assertions.

## Analysis

Recall that, under Aloni's (2007) proposal, the positive imperative with a disjunction in (12), repeated here as (13), is represented as in (14) in adult grammar:

- (13) Aka-ka-ao-o          ireru!  
 red-or-blue-ACC   put in  
 'Put a red or blue (ball) there.'
- (14) may (put a red ball)  $\wedge$  may (put a blue ball)

Importantly, the representation in (14) involves a conjunction for the interpretation of disjunction. Due to free choice effects observed in imperatives, "Do x or y" may be equated with "You may do x and you may do y" in adult grammar. Since children aged 4-5 years end up applying conjunctive reading for disjunction in simple positive assertions, having alternatives different from what adults have (Singh et al., 2016), it seems plausible that even in imperatives, the same calculation procedure is available in child grammar and that children arrive at the conjunctive representation, given in (14). Of significance here is Aloni's (2007) proposal that the alternative "A and B" is not necessitated for disjunction in imperatives in adult grammar. Recall that under Singh et al.'s (2016) proposal, such an alternative is unavailable in child grammar; in fact, its absence leads to a conjunctive reading in positive assertions. This time, the lack of this particular alternative is irrelevant for children to interpret disjunction. In other words, under Aloni's proposal, all the necessary ingredients are available in imperatives for children. Further suppose that the application of the 'may' operator is also available for children at this age, then they should be able to reach the very representation given in (14). This way, children and adults arrive at the same representation, thus the same inclusive reading in imperatives, although children lack the alternative 'A and B', which is crucial for their interpretation of positive assertions.

### Discussion: Individual variation

The current experimental result appears to show that children of this age have perfect grammar for imperatives but not for simple positive assertions. The results from two of the participants (5;01, 5;04), however, need further explanation. In Experiment 2, particularly when two balls of the same color were manipulated by the monkey (i.e. two red balls), one child rejected the positive imperatives like (13) at the rate of 100% (2/2), and the other child raised both 'correct' and 'incorrect' signs, again at the rate of 100% (2/2), which we interpret as an indication that the children in question could not decide whether the positive imperative should be accepted or not. Likewise, one child rejected negative imperatives at the rate of 100% (2/2) again, while another child rejected one of them at the rate of 50% (1/2), leaving the other question undecided, having a difficult time choosing which sign to raise. These results suggest that these two children assign conjunctive reading for disjunction even in imperatives, though we need additional experimental participants to confirm this supposition. We conjecture that such children form a conjunctive representation in imperatives as they do in positive assertions. Consequently, they might take the scope of the modal *may* to be the whole (buy oranges)  $\wedge$  (buy bananas) as in (15):

- (15) may ((buy oranges)  $\wedge$  (buy bananas))

Given the results that both positive and negative imperatives were rejected in the same manner, we speculate whether the behavior of the negative imperatives appears surprising, not observing any asymmetry with the positive imperatives, particularly if the same mechanism is responsible for both imperatives. Despite such appearance, we suggest that the behavior of negative imperatives is in fact as predicted, given Otani, Nicolae, Asano, Miyamoto and Yatsushiro's (2019) proposal for the children's interpretation of disjunction under negative assertions. In line with Singh et al. (2016), Otani et al. (2019) argue that in child grammar, recursive exhaustification is available for disjunction in negative assertions, as well as positive ones (cf. (11)). Therefore, the negative imperative (12), repeated here as (16), is represented as follows: may ((not buy oranges)  $\wedge$  (not buy bananas)).

- (16) Aka-ka-ao-o          ire-nai!  
 red-or-blue-ACC   put in-NEG  
 'Put a red or a blue (ball) there.'

To the extent that this possibility is tenable, what these children have not mastered is the scope of the modal involved in imperatives, as well as how to form a conjunctive representation in imperatives.

## Conclusion

The current report shows that, like adults, children aged 4-5 years assign inclusive reading for disjunction in imperatives. The reason why children and adults show the same reading is that their calculations of disjunction in imperatives happen to result in the same representation. Crucially, however, there is a contrast between children and adults in the derivational process of the inclusive reading in question. While adults apply ‘may’ operator to each disjunct in imperatives, as argued by Aloni (2007), children may first derive the conjunctive reading for disjunction, as they do in positive assertions, along with the ‘may’ operator applying to each conjunct. We support this dichotomy between adults and children, observing the fact that some children interpret disjunction only conjunctively even in imperatives.

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# How children with developmental language disorder use co-speech gestures to communicate

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**Abstract.** This study explores whether gesture-speech coordination in children with developmental language disorder (DLD) enhances their communication. Multimodal approaches (Kendon, 1980, 2004; McNeill, 1992) have recently been integrated in the field of language impairment. Several authors (Botting et al., 2010; Iverson & Braddock, 2011; Alibali et al., 2009) showed that children with DLD produce more gestures than typically developing (TD) children, when struggling with conceptual expression or lexical access (Mainela-Arnold et al., 2014). Can gestures aim to compensate for linguistic difficulties, thus making children with DLD produce more gesture than TD children? We video-recorded 30 French-speaking children (15 children with DLD and 15 TD children) aged 8 to 11. Children first played a guessing game with the examiner and then described their room. For each recording, we determined the quantity and types of hand gestures produced. We then examined whether gestures were strictly related to speech and how they were integrated in children's verbal productions in the two types of activities. Results showed significant qualitative and quantitative differences between TD children and those with DLD. During the guessing game, children with DLD produced more gestures, which were mostly representational. TD children produced fewer gestures, which were mostly rhythmic and self-regulatory. However, during the description task, children with DLD used fewer gestures than TD children. Both groups produced deictic and representational gestures. Moreover, the gestures were strongly complementary to speech. The findings show the complexity of gesture-speech coordination in children with DLD. Speech elaboration is a multimodal process where gestures play an important role. However, according to the nature of the difficulties in communication, gestures can both be inhibited or strongly mobilized and facilitate expression. Gestures can therefore convey additional information to what is conveyed verbally in both types of population and are used differently according to the type of activity.

**Keywords:** developmental language disorder, multimodality, co-speech gestures

## Introduction

### *A multimodal approach in language development*

Children's language development is dynamically multidimensional (Karmiloff & Karmiloff-Smith, 2001): the phonological system is necessary for the lexicon and syntax to be acquired. Children's language development is also multimodal (Morgenstern, 2014), verbal and non-verbal modalities being interdependent. Children's communication is achieved first through gestures, facial expressions and gaze, then through speech in coordination with the other modalities. Thus, gestures are preferred during the first stages of language development, to be then primarily replaced by speech, once vocal linguistic structures are acquired and integrated. But verbal and non-verbal signals are then fully articulated as children continue using all semiotic resources at their disposal. Children modulate their gestural behavior in interaction, depending on their communicative intention, interlocutor, context, and current activity (Cienki, 2017). Multimodal communication involves bodily nonlinguistic productions that can convey meaning, but also involuntary movements that are not necessarily related to the content of speech. Gestures accompanying speech are called co-speech gestures (Colletta, 2004).

A multimodal approach was recently integrated in the field of language disorders by authors who, in line with McNeill (1992), consider speech and gestures to be part of the same system. DLD is a severe and persistent language disorder that hinders the production and/or comprehension of language at the phonological, morphosyntactic, lexical, semantic and pragmatic levels. Due to the compensatory

mechanisms of the brain, children with developmental language disorder may frequently switch from one sub-category to another (Parisse & Maillart, 2009; Botting & Conti-Ramsden, 1999). Studies on the use of gestures in children with DLD bring out varied and heterogeneous data, sometimes confirming or contrasting the various hypotheses put forward by different authors. Based on the assumption that these children produce a higher number of gestures during different types of activities such as explanations, narrative or description tasks, authors state that children with DLD use gestures as a compensation mechanism to overcome language difficulties (Blake, Myszczyzyn, Jokel, & Bebiroglu, 2008; Iverson & Braddock, 2011; Mainela-Arnold, Alibali, Hostetter, & Evans, 2014). Moreover, the gestures produced often convey additional information that is not transmitted verbally (Evans, Alibali & McNeil, 2001). Other studies (Botting, Riches, Gaynor, & Morgan, 2010; Wray, Norbury, & Alcock, 2016) have shown that children with DLD performed equally to typically developing controls but their gestures were less precise. Gestures seem to have an important role as far as language production is concerned, but also in language comprehension, since using gesture in pedagogical contexts facilitates new words acquisition in children with and without language impairment (Vogt & Kauschke, 2017; Tellier, 2008).

This study explores whether gesture-speech coordination in children DLD enhances their communication. To our knowledge, no study has been conducted as far as French-speaking children with DLD are concerned, so it would be interesting to observe their multimodal behavior also in comparison with typically developing children. Moreover, in France research on gestures focuses more on younger children who are still in a developing phase. Little is known about older children who are in later stages of language development, as well as children with DLD, who have already been through several years of speech therapy. Can gestures compensate for verbal difficulties, thus making children with DLD produce more gestures than TD children?

## Method

To answer this question, we video-recorded 15 French-speaking children with DLD and 15 age-matched typically developing children. All children were aged 8 to 11 years old. Children with DLD were all officially diagnosed by a speech therapist. The following exclusion criteria were applied: no hearing impairment, no phonatory organs' malfunction, good Nonverbal IQ, no social deficit disorder, no cerebral lesion, no behavioral deficit.

Each child was video recorded during two tasks: A) each child played a guessing game with the examiner. The examiner showed 16 cards to the child. Each card contained the image of the item to be guessed. Children had to describe the image to the examiner so that he could guess the correct answer. The instructions for the game did not specify which modality should be used (gestures or speech), so children were free to use whichever strategy they preferred. B) Each child had to describe their room, while they were in another room. No detailed instructions were given during this task. The children were free to say whatever they wanted and to employ whichever modality they preferred (nonverbal or verbal).

As far as gesture types are concerned, authors have proposed several gesture classifications (Efron, 1941; Ekman & Friesen, 1969; Kendon, 1980; McNeill, 1992). We propose here a simplified gesture classification:

- Deictic gestures, which include pointing and localization gestures.
- Iconic gestures, which include gestures referring to a salient feature, shape, size, mime of a referent.
- Emblems, which include conventional recurrent gestures such as salutations, counting, thinking gestures, shrugs, palm ups.
- Self-Adaptors, which include self-regulatory gestures such as rubbing and scratching and touching a body part to adapt oneself to the interaction.
- Beats, which include gesticulation and gestures structuring speech or giving emphasis to certain words.

Thus, we hypothesized that children with DLD rely more than TD controls on gestures and that children with DLD and TD controls use different types of gestures, depending on the task. In particular, children with DLD might use more iconic gestures during the guessing game and more deictic gestures during the description task

As far as the relationship between speech and gestures is concerned, its coding was based on the classification proposed by Colletta et al. (2011), consisting of the following:

- Independent relation: gestures are independent from speech and they convey different meanings that are not related to each other. This is more the case for adaptors and beats.
- Complementary relation: gestures complete the meaning conveyed verbally and they add information about the concept or the referent.
- Substitution relation: gestures replace speech and convey meaning that is not transmitted verbally.
- Redundant relation: speech and gestures convey the same meaning; the hand movement refers to a concept expressed verbally and occurring at the same time as the gesture.

Thus, we hypothesized that, during the guessing game, speech and gestures would be in a complementary or substitution relationship whereas, during the description task, speech and gestures would be in a more redundant and complementary relationship.

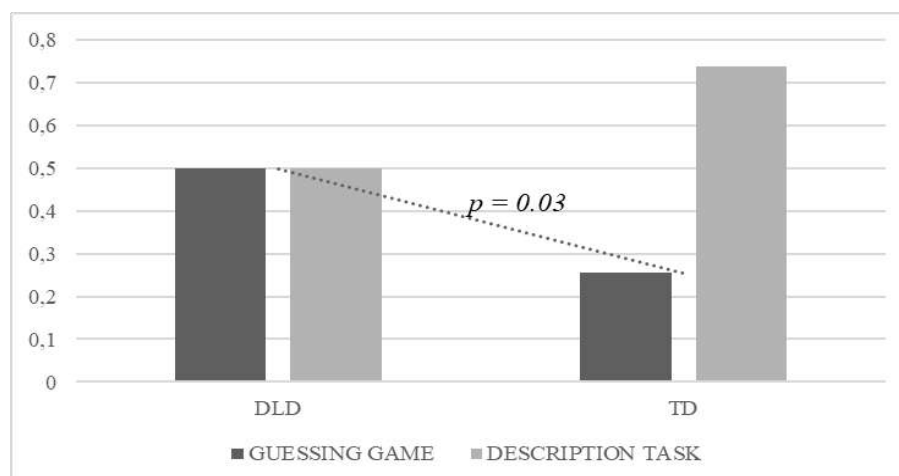
## Results

### *Gesture – utterance ratio*

**Table 1. Total number of gestures and total number of utterances**

	GUESSING GAME		DESCRIPTION TASK	
	DLD	TD	DLD	TD
<b>Gestures</b>	285	140	70	147
<b>Utterances</b>	571	548	140	199

**Figure 1. Gesture – utterance ratio**



During the guessing game children with DLD produced a gesture-utterance ratio of 1:2, as well as during the description task (guessing game ratio: 0.5; description task ratio: 0.5). Each child gestured during the guessing game but not all children gestured to describe their room. They seemed to rely more on gestures during the guessing game because their verbal productions were constrained by the task, whereas during the description task children with DLD seemed to rely on compensatory

strategies to reduce difficulties and therefore, they sorted and selected what could be said without their expression being affected by the language impairment (Delage, Monjauze, Hamann, & Tuller, 2008).

During the guessing game TD children produced a gesture-utterance ratio of 1:4, whereas they produced almost one gesture per utterance during the description task (guessing game ratio: 0.2; description task ratio: 0.7). It should be noted that the TD children's descriptions were longer than those of children with DLD. The more information there was, the more chances there were for co-speech gestures to occur. This could be the case for TD children. On the contrary, not all the TD children gestured during the guessing game, which could relate to a better mastery of the task, as well as better language skills. While the strategies of children with DLD were based more on the non-verbal modality, TD children gave more precise verbal cues to make the examiner guess the item.

### *Gesture types*

**Table 2. Gesture types produced during the two tasks**

	GUESSING GAME			DESCRIPTION TASK		
	DLD	TD	<i>p</i>	DLD	TD	<i>p</i>
<b>ADAPTORS</b>	14%	21.50%	0.3	17%	8.10%	1
<b>BEATS</b>	9.47%	44%	0.11	20%	18.40%	0.3
<b>DEICTIC</b>	5.20%	3.60%	0.1	30%	40.80%	0.1
<b>EMBLEMS</b>	10%	4.20%	<b>0.03</b>	3%	0.68%	1
<b>ICONIC</b>	61%	26.40%	<b>0.001</b>	30%	31.90%	0.1

During the guessing game, children with DLD massively produced iconic gestures (61%). Overall, it seems that children with DLD relied more on gestures to convey meaning. Children with DLD focused mostly on a salient feature of the item to be guessed and they exploited it to provide the observer with visual non-verbal cues. The referential gestural representation of the items may derive from the fact that for these children the non-verbal modality is an alternative and a compensatory strategy accompanying their verbal productions, hindered by the language impairment. The number of adaptors (14%) could be explained by a feeling of discomfort caused by the interaction with an unknown examiner, or by moments of reflection.

As far as TD children are concerned, the most frequently produced gestures are beats (44%) and iconic gestures (26.4%). Beat gestures are not dependent on the content of speech but are used to structure and give rhythm to speech or emphasize a certain word.

During the description task children with DLD produced a much lower number of gestures compared to the number of gestures produced by typical children. During this task, the group produced as many deictic as iconic gestures (30%). Children with language disorders have trouble with spatial and temporal representation, therefore, we need to conduct specific qualitative analyses of the group performance: deictic gestures are produced more by two children in particular, while almost all children who produce gestures during this task produce iconic gestures.

Typically developing children produce a higher number of gestures. The group produced a majority of deictic gestures (40.8%) but also iconic gestures (31.9%). Children produced deictic gestures by pointing at a referent, often absent in the room or replacing the target referent by a same referent present in the room (*Deixis ad fantasma*, Bühler, 1934). Deictic gestures can also be finger movements tracing lines or drawing geometric forms, placing the elements of the room in the space around oneself. Above all, they can be movements of the arms or hands, to the right or to the left,

front or back, up or down, indicating the direction or the spatial placement of the elements of the room.

### *Gesture-speech relation*

Since we know that, during the guessing game, children with DLD produced a majority of iconic gestures, we found a complementary or substitution relationship between speech and gestures: gestures convey either part of the message conveyed or the entire meaning of what the child wants to express, the verbal modality being absent. Since we know that, during the description task, children with DLD produced a majority of deictic and iconic gestures, the former have a complementary relationship with speech, while the latter are mainly in a relationship of redundancy (see Table 3).

**Table 3. Gesture – speech relation during DLD children’s tasks**

<b>DLD: gesture-speech relation</b>								
	<b>GUESSING GAME</b>				<b>DESCRIPTION TASK</b>			
	<b>COM</b>	<b>IND</b>	<b>RED</b>	<b>SUB</b>	<b>COM</b>	<b>IND</b>	<b>RED</b>	<b>SUB</b>
<b>ADA</b>	0.00%	14.39%	0.00%	0.00%	0.00%	17.14%	0.00%	0.00%
<b>BEA</b>	0.00%	8.77%	0.00%	0.00%	0.00%	20.00%	0.00%	0.00%
<b>DEI</b>	4.21%	0.00%	0.00%	1.05%	17.14%	0.00%	12.86%	0.00%
<b>EMB</b>	5.61%	0.00%	0.70%	3.86%	2.86%	0.00%	0.00%	0.00%
<b>ICO</b>	29.12%	0.35%	12.63%	19.30%	14.29%	0.00%	15.71%	0.00%
<b>Total</b>	<b>38.94%</b>	<b>23.51%</b>	<b>13.33%</b>	<b>24.21%</b>	<b>34.29%</b>	<b>37.14%</b>	<b>28.57%</b>	<b>0.00%</b>

As far as TD children are concerned, we know that during the guessing game they produced a majority of beat gestures, therefore we found an independent relation between gestures and speech. In particular, beat gestures are independent of the content of speech but not of the utterance structure, because these gestures give rhythm to the child’s speech. During the description task, TD children produced a majority of deictic gestures: these gestures mostly have a relationship of redundancy (the gesture refers to a referent already expressed verbally) and complementarity (the gesture complements the child’s utterance) with the verbal modality (see Table 4).

**Table 4. Gesture – speech relation during TD children’s tasks**

<b>TD: gesture-speech relation</b>								
	<b>GUESSING GAME</b>				<b>DESCRIPTION TASK</b>			
	<b>COM</b>	<b>IND</b>	<b>RED</b>	<b>SUB</b>	<b>COM</b>	<b>IND</b>	<b>RED</b>	<b>SUB</b>
<b>ADA</b>	0.00%	21.43%	0.00%	0.00%	0.00%	8.16%	0.00%	0.00%
<b>BAT</b>	0.00%	44.29%	0.00%	0.00%	0.00%	18.37%	0.00%	0.00%
<b>DEI</b>	3.57%	0.00%	0.00%	0.00%	15.65%	0.00%	17.69%	7.48%
<b>EMB</b>	0.00%	0.00%	0.00%	4.29%	0.00%	0.00%	0.00%	0.68%
<b>ICO</b>	15.71%	0.00%	7.14%	3.57%	14.29%	0.00%	14.97%	2.72%
<b>Total</b>	<b>19.29%</b>	<b>65.71%</b>	<b>7.14%</b>	<b>7.86%</b>	<b>29.93%</b>	<b>26.53%</b>	<b>32.65%</b>	<b>10.88%</b>

## **Discussion**

The aim of this study was to investigate the use of gesture by children with developmental language disorder, in comparison to typically developing age-matched controls. Thus, we asked how children with DLD use gestures to convey meaning during two different types of activities, namely a guessing game and a description task. We hypothesized that children with DLD would rely more on gestures than TD children, throughout the two tasks proposed. This hypothesis was partially validated: children with DLD produced a higher number of gestures (285 occurrences) than TD children (140 occurrences) during the guessing game. A Wilcoxon Test showed that these differences were significant ( $p = 0.01$ ). Children with DLD produced fewer gestures (70 occurrences) than the TD group (147 occurrences) during the description task. Differences between the two groups on this task were not significant ( $p = 0.07$ ) as the number of gestures was related to the number of utterances. We also asked what types of gestures children produced during the two tasks, which led us to a second hypothesis: there would be a difference in the multimodal productions during the two tasks, especially in the use of gesture types. As expected, children with DLD produced more iconic gestures (61%) during the guessing game, whereas TD children produced more beats (44%) and iconic gestures (26%). Differences were significant only as far as emblems ( $p = 0.03$ ) and iconic gestures ( $p = 0.001$ ) were concerned. Children with DLD produced the same number of deictic and iconic gestures (30%) during the description task, whereas TD children produced more deictic gestures during the description task (40.8%). A Wilcoxon test showed no significant differences between DLD children and TD. Finally, a Wilcoxon Test showed significant differences in relation to the tasks for the DLD group ( $p = 0.001$ ).

Our results are similar to those of other authors. In general, children with DLD in our study produced more gestures in relation to speech than TD children. This result confirms other authors' studies such as Blake et al. (2008), Iverson and Braddock (2011), and Mainela-Arnold et al. (2014). During the description task, children with DLD produced fewer gestures than TD children but they were mostly deictic and iconic, as suggested by Blake et al.'s study. In terms of gesture-speech relation, our findings go in the same direction as Mainela-Arnold et al. (2014) and Evans, Alibali and McNeil (2001) who found that, during a narration task, children with DLD were less redundant, so gestures conveyed more meaning than speech. Even though the tasks in the other studies mentioned above were different, we can say that, globally, children with DLD use more gestures as a compensatory strategy or to convey additional meaning, given that they have difficulties conveying verbally. As far as TD children are concerned, the abundant use of beats highlights the final stage of multimodal language acquisition: beat gestures emerge from five years old (McNeill, 1992) when almost all the linguistic structures are acquired and integrated by the child. We shall also stress the role of the task: the type of activity influences the amount and the type of gestures produced to convey meaning and the more difficult and complex is the task, the more gestures are produced or not, depending on the semantic content of communication. As was shown by the description task, children with DLD produced fewer gestures because their knowledge about space is limited, thus gestures are hindered as well as speech.

## Conclusion

In conclusion, we found differences between groups, tasks and the type of gestures produced and their relation to speech. Gestures seem to be strongly complementary to speech. Thus, they are inherent to the elaboration of speech but according to the nature of the difficulties in the linguistic elaboration, gestures can either not be relied upon, which was the case during the description task, or be strongly mobilized and facilitate communication, which was the case during the guessing game.

The fact that not all children with DLD produced gestures during the guessing game, as well as the fact that not all children with DLD produced gestures during the description task, highlights the heterogeneity of this language disorder for which causes and effects are not fully known.

In this study, gestures seem to have two different functions: they are a support for children with DLD when they fail to use speech. Gestures are therefore an additional means that conveys information, sometimes absent from the child's speech. In addition, recourse to gestures takes place in particular in

cases where linguistic constraints are imposed or when children encounter difficulties in expressing concepts or accessing lexicon: during the guessing game, children had to be careful not to say certain words that would have been too transparent for the aims of the activity, that is, to make the interlocutor guess a word through explanation. Gestures, even the most referential ones, help children with DLD to communicate better and they occur in multimodal productions in which their relation is typically redundant but often complementarity to speech. These gestures seem to be a support for the child to fully express concepts conveyed verbally.

These findings show the complexity of gesture-speech coordination in children with DLD. Speech elaboration is a multimodal process in which gestures play an important role. However, according to the nature of the situation or activity, gestures can be either inhibited or strongly mobilized and facilitate expression. The interaction between spontaneous gestures, speech and mental representation of referents could be a key factor to improve language mastery in children with DLD.

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## Can the aspect hypothesis explain the use of tense-aspect morphology by French-English bilingual children?

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**Abstract.** This study investigates the influence of lexical aspect on the use of tense-aspect morphology by bilingual children (Li & Shirai, 2011). Monolingual children restrict early uses of perfective past tense markers to verbs whose lexical aspect is compatible with perfectivity – telic, punctual verbs (Brown, 1973). Shirai and Andersen (1995) proposed that children construct a prototype of the use of perfective past tense markers by analyzing regularities in the input. Bilingual children receive less input in each of their languages. We wondered whether they would undergeneralize the use of tense-aspect morphemes longer than their monolingual peers. We used the *Hervé Corpus* (Hervé & Serratrice, 2018) to analyze the productions of two French-English bilingual children aged 2;4 to 3;7 living in the United Kingdom. The children were recorded once a month in their two languages for one year. During the sessions, the children participated in monolingual interactions with a close family member. We confronted parental input patterns to the children’s use of tense-aspect markers. Our results suggest that bilingual children are able to extract frequent form-function pairings in the input and tend to overuse these associations in the early stages of acquisition. We also show that in their dominant language, the two bilingual children under study followed the same acquisition trend as their monolingual peers regarding tense-aspect morphology - they were gradually able to extend the use of tense-aspect morphology across lexical aspect categories.

**Keywords:** lexical aspect, tense-aspect morphology, bilingualism, usage-based theory

### Introduction

The aim of this work is to explore the use of verbal morphology in French-English bilingual children aged 2;4 to 3;7. Studies on the acquisition of tense-aspect morphemes have highlighted the role of factors such as frequency of the form in the input, functional complexity or discursive saliency (Goldberg, 2006; Paradis, 2010; Paradis, Nicoladis, Crago, & Genesee, 2011; Parris, de Pontonx & Morgenstern, 2013, 2018; ; Parris & Morgenstern, 2012; Tomasello, 2009).

Close analysis of how this morphology is acquired has identified an uneven distribution of tense-aspect morphemes across lexical aspect categories in the speech of young monolingual children (Bloom, Lifter, & Afitz, 1980; Bronckart & Sinclair, 1973; Brown, 1973). They observed preferential associations between the perfective past tense and telic predicates and between the imperfective past tense and atelic predicates. The first studies observing such associations focused on the productions of English monolingual children. The interaction between grammatical and lexical aspects was analyzed in a study focused on French monolinguals aged 2;11 to 8;7 (Bronckart & Sinclair, 1973). It was found that children under six years old used the French perfective past tense mostly with non-durative, telic events. Children undergeneralized the use of tense morphemes to highly compatible lexical aspects, suggesting that tense morphology is used at first to mark aspectual rather than temporal distinctions (Bloom et al., 1980; Bronckart & Sinclair 1973; Brown, 1973). The aspect hypothesis (Andersen & Shirai, 1994; Shirai & Andersen, 1995) used parental input to explain preferential associations between lexical aspect and past tense morphemes in the productions of children aged 1;6 to 2;6. Andersen and Shirai (1994) identified a “distributional bias” in child-directed speech where 60% of perfective past tense forms were used with telic events. They concluded that children build prototypical associations from their input between perfective morphology and corresponding lexical aspects. This “undergeneralization” of tense morphemes was observed in the speech of monolingual children, who receive a stable input in a single language, until approximately 2;0. They then started using tense-aspect morphology across lexical aspect categories. Our study

aimed to test the aspect hypothesis on French-English bilingual children. We wondered whether bilingual children would strongly associate tense-aspect morphemes and specific lexical aspects and whether these associations would stay strong longer than in the speech of monolingual children. We assumed that monolinguals might draw regular patterns and build prototypes from their input more easily than their bilingual peers, who are often less exposed to each of their languages. Moreover, bilingual children rarely receive the same amount of input in each of their languages, which could yield dominance effects. Finally, cross-linguistic differences may induce different acquisition patterns for bilingual children.

Lexical aspect refers to the semantic content of verbal predicates. The utterances used below are drawn from the *Hervé Corpus* (Hervé & Serratrice, 2018). The first feature is duration, i.e. whether a situation takes place over a period of time. It distinguishes the utterances “*why you broke it?*” and “*I wrote his name*” – the former depicts a punctual event and the latter an event with duration. The second feature is telicity, i.e. whether the situation described by the predicate has inherent endpoints. The predicates in “*I wrote his name*” and “*she was eating cupcakes*” differ with regards to telicity. The former is telic, whereas the latter is atelic. The third feature is dynamicity, i.e. whether a situation requires an input of energy. Dynamicity distinguishes the verb constellations “*that is Ella when she was small*” (non-dynamic) and “*she was eating cupcakes*” (dynamic). These features are often used to highlight the differences between the four “time schemata” identified in Vendler’s (1957) article, often illustrated as in Table 1.

**Table 1. Vendler's Time Schemata (1957)**

States	_____
Activities	~~~~~
Accomplishments	~~~~~X
Achievements	X

The straight line used to depict the internal constituency of states shows they include situations presented as homogeneous, with no successive stages or endpoints. Activities are depicted as encoding situations consisting of successive stages with no endpoints. The tildes indicate that activities are [+dynamic]. Accomplishments include an inherent endpoint. They are [+telic]. Finally, achievements consist only of an endpoint. They are [+telic] and [-durative]. Describing Vendler’s categories in terms of the absence or presence of one of these semantic features presents the advantage of making them visible (Shirai, 1992), as illustrated in Table 2.

**Table 2. Temporal features of lexical aspect categories**

	Durative	Telic	Dynamic
States	+	-	-
Activities	+	-	+
Accomplishments	+	+	+
Achievements	-	+	+

Lexical aspects in English and French can be described using these categories, although a predicate and its translation might not fall into the same category.

Grammatical aspect refers to the distinction between perfective and imperfective aspects. The perfective aspect allows a speaker to take an external view on a situation. It includes the endpoints of the situation and entails its completion. The imperfective aspect allows a speaker to present a situation from within. It disregards potential endpoints of the situation and does not entail its completion (Comrie, 1976; Smith, 2013). A striking difference between the aspectual systems of French and English is that English may mark grammatical aspect in present and past tenses, whereas French morphologically marks it only in the past tense. The French *imparfait* is an imperfective past tense,

whereas the French *passé composé* is a perfective past tense. We expected to find an association in the input between telic forms and past tense markers and made the hypothesis that these associations would be strengthened in the children's speech. We expected them to be stronger in French than in English, as French has an imperfective past tense and a perfective past tense whereas the English past tense may yield either perfective or imperfective interpretations.

## Method

This study was conducted on the *Hervé Corpus* (Hervé & Serratrice, 2018), a longitudinal corpus of two French-English bilingual children, Sophie and Anne, recorded once a month in their two languages for one year. Both children were exposed to English and French from birth and used both languages daily. In both families, the father is a native speaker of English and the mother is a native speaker of French. Both families adopted strategies to ensure their languages were featured daily in the linguistic environment of their children. Both children were dominant in English and rarely used French during the English sessions, whereas they used English often during the sessions in French, both in monolingual and mixed utterances. Sophie's mean length of utterances (MLUw) in both languages was slightly ahead of Anne's (see Tables 3 and 4).

**Table 3. Anne's MLU at each recording**

Anne	MLU French	MLU English	Age
Video 1	1.783	1.577	2;4
Video 2	1.715	1.689	2;5
Video 3	1.898	/	2;6
Video 4	1.863	1.984	2;7
Video 5	2.259	2.891	2;8
Video 6	2.433	3.424	2;9
Video 7	2.502	3.197	2;10
Video 8	3.021	3.232	2;11
Video 9	3.224	3.997	3;0
Video 10	2.423	3.745	3;1
Video 11	3.033	3.745	3;2
Video 12	/	4.009	3;4

**Table 4. Sophie's MLU at each recording**

Sophie	MLU French	MLU English	Age
Video 1	2.895	3.595	2;6
Video 2	3.379	3.383	2;7
Video 3	3.042	3.553	2;8
Video 4	3.132	3.521	2;9
Video 5	3.458	3.54	2;10
Video 6	3.376	4.403	3;0
Video 7	3.514	4.345	3;1
Video 8	3.137	3.699	3;2
Video 9	4.699	4.101	3;3
Video 10	3.859	3.757	3;5
Video 11	4.625	/	3;6
Video 12	3.691	4.563	3;7

We used transcriptions in the CHAT format (MacWhinney, 2000) as well as video recordings of the sessions. We coded all inflected verbs for grammatical tense, regardless of their grammatical accuracy in children's utterances. When ambiguous, coding was decided based on parental interpretation or cues in the immediate context. We then coded verbs in the past tense for grammatical and lexical aspect. For this paper, we focused on simple and progressive past forms in English and *passé composé* and *imparfait* in French.

## Results and discussion

Tables 5 and 6 display the distribution of English simple past tense forms and French *passé composé* forms across lexical aspect categories by the children and their parent during the period analyzed in the current study. They give the percentage of forms used in each lexical aspect category, as well as the token count in parentheses. The children produced few *imparfait* and these are thus not displayed in Tables 5 and 6.

**Table 5. Distribution of simple past forms across lexical aspects (% based on token counts)**

	State	Activity	Accomplishment	Achievement
<b>Anne-input</b>	25 (165)	21 (136)	26 (169)	28 (180)
<b>Anne</b>	21 (41)	15 (30)	25 (49)	39 (79)
<b>Sophie-input</b>	31 (194)	22 (133)	23 (141)	24 (151)
<b>Sophie</b>	20 (32)	17 (28)	30 (49)	33 (54)

**Table 6. Distribution of *passé composé* forms across lexical aspects (% based on token counts)**

	State	Activity	Accomplishment	Achievement
<b>Anne-input</b>	1 (7)	32 (176)	30 (165)	37 (165)
<b>Anne</b>	0 (0)	8 (3)	11 (4)	81 (30)
<b>Sophie-input</b>	4 (23)	23 (144)	30 (189)	43 (266)
<b>Sophie</b>	0 (0)	4 (2)	35 (19)	61 (33)

### Anne

In English, Anne's parents used 650 simple past tense forms and only 24 past progressive forms. The data shows a slight tendency for them to inflect telic predicates for the past tense more frequently than atelic ones – 54% of simple past tense forms were used with telic predicates. Past progressive forms were associated with activity predicates 92% of the time. Anne nevertheless did tend to use the past tense more frequently with telic predicates, although not to the same extent as what was noted in previous studies. Anne used 198 past tense forms, and 64% of these were telic predicates. This rather low percentage may be linked to age – the rates were strong in the first sessions and steadily decreased as Anne got older. At age 2;7, Anne used the past tense exclusively with telic predicates, producing utterances like “*Daddy woke up*”. By the end of the period she used the past tense with stative predicates 55% of times, in utterances like “*I saw their eyes and they were green*”. This is consistent with findings on English monolingual children from 2;0 onwards, suggesting that Anne followed similar acquisition trends as her monolingual peers in her dominant language.

In French, Anne's parents showed a distributional bias in their use of perfective past tense forms. Sixty-seven percent of the *passé composé* forms they produced were telic predicates and 92% of the *imparfait* forms they used were atelic predicates. Anne showed a tendency to undergeneralize the use of the perfective past tense to achievements and to a lesser extent to accomplishments, over-using frequent associations in her input between telic, punctual predicates and perfective morphology. When analyzing the data session by session, we noticed that the rates of association between perfective morphology and telic predicates were weaker in the first two sessions. Analyzing an example from these sessions shows how Anne seems to align her use of tense-aspect morphology with her mother's during interactions that she did not initiate.

#### Example 1: Tense alternation in adult-initiated utterance (Anne, 2;6)

\*MOT: Anne elle *faisait* quoi? (what was Anne doing?)

\*CHI: elle *marchait*. (she was walking.)

\*MOT: ah tu *as marché*. (you walked.)

\*CHI: non+non *marché/marchait*. (no no walked.)

\*CHI: *a porté*. (carried)

\*MOT: ah t'*as porté* Papa? (you carried daddy?)

The mother asks a question about an activity, using the *imparfait* (“*faisait*”); Anne answers using the same morphology creatively with a different verb (transcribed as “*marchait*”). The mother then takes a perfective stance, using a *passé composé*. Anne seems to want to repair her mother's production by saying “*non non*” and she repeats the verb form “*marché/marchait*” without an auxiliary which makes it sound like an *imparfait*. Indeed, *imparfait* and past participles of French first group verbs are very similar phonologically. She then produces a full *passé composé* form with an activity verb (“*a porté*”), and thus continues to align with her mother's use of past-tense morphology. Despite their

frequency in the input, Anne produced only 4 *imparfait* forms, suggesting functional factors may explain the acquisition of this form better than frequency factors.

### Sophie

In English, Sophie's parents associated telic verbs with the simple past tense less than reported in previous studies. Only 47% of past tense forms were used with telic predicates. Nevertheless, Sophie tended to undergeneralize these morphemes, as 63% of the past tense forms she used included telic predicates. The percentage of association between the past tense and telic predicates does not steadily decrease over the period, which may indicate that she has begun generalizing the past tense across lexical aspect categories. Sophie associated the past tense either with telic or atelic predicates, producing utterances such as "*I forgot*" ([-durative], [+telic]) at 2;7 and "*we did jumping jacks*" ([+durative], [-telic]) at 3;5, displaying target-like use of the English simple past across lexical aspects. Her productions in each session mirror and somewhat exaggerate form-function pairings in her input. At age 3;5, we observe a drop in the association of past tense forms with telic events. Only 25% of the past tense forms Sophie used in this session were part of telic predicates. This low rate mirrors her input – during that session, only 35% of the past tense forms used by her parents were part of telic predicates. This may be explained by situational factors, as shown by close analysis of an extract from this session.

#### Example 2: Situational factors in the use of perfective morphology (Sophie, 3;5)

- \*MOT:           where did you go this morning Ella?
- \*CHI: what *did* Ella *play* with Emily?
- \*MOT:           she *played* with all the kids there.
- \*MOT:           she *played* with lots of toys and she played mainly with a Hello Kitty scooter.
- \*CHI: +< Mummy *did* she *play* with +//?
- \*CHI: what *did* [/] <what did sh(e)> [/] what did you *do* with Lily?

During most of the session, Sophie uses the present tense. Halfway through, her mother and sister come home. Her mother encourages her sister to talk about their afternoon and Sophie asks about what they did. She uses activities (i.e. atelic predicates) in the past tense, showing her ability to use the past tense with different lexical aspects in a target-like fashion.

Sophie's parents produced 36 past progressive forms, 94% of the times with activity predicates. Sophie's use of the past progressive mirrors that of her parents – she used it less than she did the simple past and almost exclusively with activities.

In French, 73% of the *passé composé* forms used by Sophie's parents were part of telic predicates. Sophie used 54 *passé composé* forms, 96% of which with telic predicates. The associations between the perfective past tense and telic predicates were stronger in Sophie's productions than in her parents' speech during each session, suggesting that she consistently over-used frequent associations found in her input in French. Ninety-five percent of the *imparfait* forms used by Sophie's parents were part of atelic predicates. Sophie used only 8 *imparfait* forms, exclusively with atelic predicates. Again, this hints at the importance of functional factors in the acquisition of the French *imparfait*.

### Conclusion

Our findings tend to confirm the aspect hypothesis. Both children over-used associations found in their input between the (perfective) past tense and telic predicates. In English, the simple past was used across lexical aspect categories, although it was used more with telic predicates by the children than by the adults. The rates of these associations were however less strong both in the input and in the children's productions than what was previously found. This can be explained by an age factor, as the bilingual children we studied were older than in previous studies, suggesting that when English is their dominant language bilingual children use the past tense following the same acquisition trends as monolinguals. After temporarily undergeneralizing the past-tense to telic predicates, they extend its use to all lexical aspects. The low rates of associations found in the English adult data suggests that

input alone cannot account for children's higher rates of associations of the past tense with telic predicates in English. Future work will attempt to analyze situational factors that may account for the rates of association in children's speech between the English past tense and telic predicates. In French, the perfective past tense was frequently associated with telic predicates, and more so by the children than the adults, suggesting that children undergeneralize the use of this form. The imperfective past tense was used mostly with atelic predicates. Despite its high frequency in the input, it was rarely produced by the children, confirming the importance of functional complexity factors in its acquisition (Morgenstern, Boutet & Debras, 2018). In French, the children's tendency to associate perfective past morphology to telic predicates consistently over the period may be linked to either dominance factors or cross-linguistic differences in the past tense systems of the two languages. Future work will address this question by investigating a longitudinal corpus of French monolingual children of the same age.

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## Investigating the production of Italian palatals by English-speaking learners: An acoustic study

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**Abstract.** This study examines the production of the Italian [ʎ] (e.g. <tovaglia> [to.'va.ʎa] 'tablecloth') and [ɲ] (e.g. <gnomo> [ɲɔ.mo] 'dwarf') by English-speaking learners. Five native English speakers and two native Italian speakers completed a production task, a reading task and a language background questionnaire. An acoustic analysis was conducted, where F1, F2, F3 and F4 for /ʎ/ and duration for /ɲ/ were measured. The results showed that both sounds are difficult for second language learners to acquire in a target-like manner. Moreover, each of these complex sounds may be produced as a sequence of existing first language sounds. We discuss the implication of these findings for L2 models of speech learning

**Keywords:** L2 speech learning, Italian, English, palatal lateral approximant, palatal nasal

### Introduction

In recent years, the field of second language (L2) speech learning has been growing, where researchers have examined the acquisition of languages beyond English, such as Spanish (e.g. Colantoni & Steele, 2005; Cordero, Ruiz-Pena, Sierra, Stevenson, & Rafat, 2018; Rafat & Stevenson, 2017; Ruiz-Peña, Sevilla, & Rafat, 2017), French (e.g. Russell Webb, 2009; Colantoni & Steele, 2008; Van't Veer & Botma, 2013), Dutch (e.g. Wester, Gilbert, & Lowie, 2007; Cornwell & Rafat, 2017), Mandarin (e.g. Chen, 2006; Jia, Strange, Wu, Collado, & Guan, 2006; Jiang, 2010; Chang, Yao, Haynes, & Rhodes, 2011), and Farsi (e.g. Rafat, Mohaghegh, & Stevenson, 2017). However, only a few studies have focused on the L2 acquisition of Italian (e.g. Buscetta, 2008; Soriano, 2014).

This study investigates the L2 production of the voiced palatal lateral approximant [ʎ] (e.g. <tovaglia>, [to.'va.ʎa], 'tablecloth') and the voiced palatal nasal [ɲ] (e.g. <gnomo> [ɲɔ.mo] 'dwarf') by conducting an acoustic analysis. These sounds appear in only 4% of the languages analyzed by the UCLA Phonological Segment Inventory Database (UPSID) and are considered marked sounds. In the Italian phonetic inventory, [ʎ] is among the last consonants to appear in the phonetic inventory of a child and tends to be replaced by the approximate [j] (Zmarich, Stocco, Minozzi, & Bonifacio, 2005). Whereas both sequences of sounds [lj] and [nj] exist in both Italian (e.g. <italiano> [i.ta.'lja.no] 'Italian' and <geniale> ['dʒe.ɲja.le] 'genius') and English (e.g. <million> ['mɪljən]) and <onion> ['ʌɲjən]), [ʎ] and [ɲ] only exist in Italian (Berti, 2014). Therefore, [ʎ] and [ɲ] lend themselves well to an examination of their production by English-speaking learners because an English learner of Italian would have to acquire these sounds in their L2.

Five native English speakers and two native Italian speakers completed a production task, a reading task and a language background questionnaire. The participants completed two experimental tasks in this study: (1) a picture-naming task and (2) a reading task. They also completed a language background questionnaire. The research questions driving this study are as follows:

1. Can English-speaking learners produce the Italian [ʎ] and [ɲ] in a native-like manner?
2. Which phonetic parameters of these sounds are difficult to acquire?

*The Italian voiced palatal lateral approximant [ʎ] and the voiced palatal nasal [ɲ]*

The particularity of the voiced lateral palatal approximant lies in the articulatory position of the tongue, which must be raised and flattened against the palate, while the stylolous muscle is contracted. The transverse muscle narrows the tongue so as to leave gaps at the side edges and allow air to flow freely. The Italian [ʎ] corresponds to <gli> in writing when it is followed by any other vowel. The Italian [ʎ] mostly appears in intervocalic (e.g. <tovaglia> [to'.va.ʎa] 'tablecloth') and coda (e.g. <scogli> [sko.ʎi] 'cliffs') positions. However, it can also appear in word-initial position, albeit in eight words, where the dative pronoun *gli* combines with another accusative pronoun (e.g. <glielo> [ʎelo], 'it.ACC.M.S. to him/her/them.DAT'). In all other contexts, such as when <gli> is followed by a consonant or when <gl> is not followed by an <i>, <gl> is realized as [gl] (e.g. <anglicismo> [an.gli.'tʃi.zmo] 'anglicism'; <inglese> [in.'gle.se] 'English').

The Italian [ɲ] is produced with a raised and flattened tongue, while the transverse muscle is activated, letting the air flow freely from the nasal cavity. The Italian [ɲ] corresponds to <gn> in writing. It can be found word-initially (e.g. <gnomo> [ɲno.mo] 'dwarf'), or intervocalically (e.g. <ordigno> [or.'di.ɲo] 'bomb'), where it is more frequent. Recansens and colleagues (1993) reported that the duration for the Italian [ɲ] ranges between 63-128ms.

In English, [ʎ] and [ɲ] do not exist, but the sequences [lj] (e.g. <million> ['mɪljən]) and [nj] (e.g. <onion> ['ʌnjən]) are present (Berti, 2014).

### *Flege's Speech Learning Model*

The Speech Learning Model (Flege, 1995) hypothesizes that 'old sounds' exist in L1 and, therefore, will not be problematic for learners. On the other hand, 'new sounds' will be easily acquired by learners when there is a large acoustic-phonetic distance between comparable sounds in the L1 and L2. These 'new sounds' are distinct from 'similar sounds'. It is 'similar sounds' that will be problematic for learners as they are not different enough from the pre-established L1 sounds and will be mapped on to L1 categories. That is, the smaller the acoustic distance between the L1 and the L2 sounds, the higher the probability of equivalence classification.

## **Hypotheses**

The hypotheses in this study are the following:

H1. Based on Flege (1995), English-speaking learners will have difficulty acquiring [ʎ] and [ɲ] because they will be perceived as similar sounds and, therefore, assimilated to the L1 categories (e.g. [ʎ] will be mapped on to [l] or [j], and [ɲ] will be mapped on to [n] or [j]).

H2. English-speaking learners will substitute [ʎ] with [lj] (Berti 2014) and [ɲ] with [nj] because of transfer from the L1 (Bongiovanni 2015).

H3. L2 learners will not exhibit native-like production of [ʎ] and [ɲ] acoustically (Colantoni & Steele, 2008; Ruiz-Peña, Sevilla & Rafat (2017).

## **Methodology**

### *Participants*

The present study included two groups of participants: (1) five native English speakers learning Italian as an L2 and (2) two native speakers of Italian. The group of the English-speaking L2 Italian learners included four beginners and one advanced learner of Italian. The ages of the participants ranged between 19 to 21, and the age of onset of acquisition was between 17 and 19 years. All participants were studying at Western University in Ontario, Canada and their teachers were from northern Italy. The control group of native Italian speakers included two native speakers of Italian from Milan and Siena. Their ages were 28 and 55.

### *Tasks*



The participants of the study first completed a picture-naming task followed by a reading task. In the picture-naming task, the participants were presented with images of the words, one image at a time and were asked to say the token in the carrier sentence «*Dico \_\_\_\_\_ un'altra volta*» (“I say \_\_\_\_\_ one more time”) three times, using a Microsoft PowerPoint presentation. In the reading task, participants were presented with a word on the screen and were asked to read it 3 times in the same carrier sentence. The presentation of the stimuli was randomized in each task. Participants also completed a language background questionnaire, adapted from Montrul (2012).

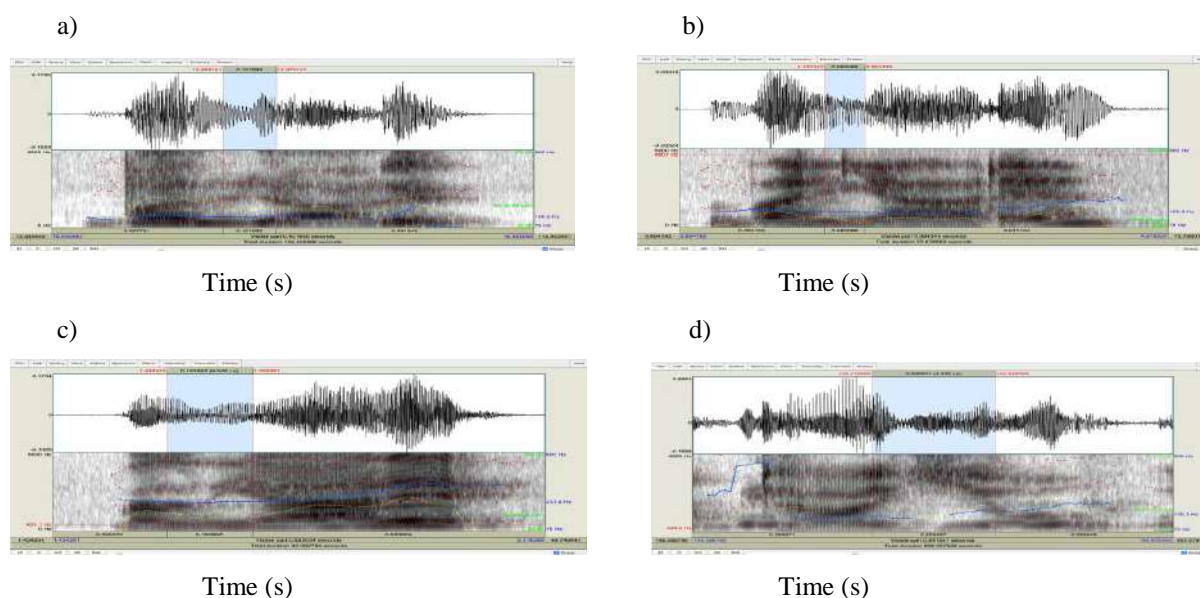
### Stimuli

The stimuli included 48 target words and 15 distractors in Italian. All words were frequent words in Italian. Twenty (24) of the target words included [ʎ] and the rest included [ɲ]. The stimuli were controlled for the number of syllables and stress: all target words were trisyllabic words, and the target sounds appeared in both stressed and unstressed intervocalic positions. The distractors were bi-syllabic words that did not include the target sounds. The database Parole Con (<https://www.parolecon.it>) was used to create the stimuli list.

### Data analyses and results

A total of 152 tokens were acoustically analyzed using *Praat* (Boersma and Weenink 2019) by one of the authors who is a native speaker of Italian. We measured F1 (height), F2 (backness), F3 (roundness) and F4 (naturalness) for [ʎ] and duration for [ɲ].

Different types of productions were attested for the target sound [ʎ]. Figure 1 presents four spectrograms of the word <vagliare> [va.'ʎa.re] ‘to sift’, where the highlighted area corresponds to the Italian [ʎ].



**Figure 1. Sample waveforms and spectrograms of the word <vagliare> [va.'ʎa.re] ‘to sift’. The highlighted area corresponds to the production of Italian voiced palatal lateral approximant [ʎ] by different speakers: (a) [ʎ] by L1 Italian speaker; (b) non-target [ʎ] by advanced Italian L2; (c) [lj] by beginner Italian L2; (d) [j] by beginner Italian L2**

Figure 2 shows the percentage type of production of the target [ʎ] by English-speaking learners. The voiced palatal lateral approximant [ʎ] and the [j] were each produced at a 20% rate, but the sequence [lj] was produced at a 60% rate by the English-speaking learners. There were no [l] productions.

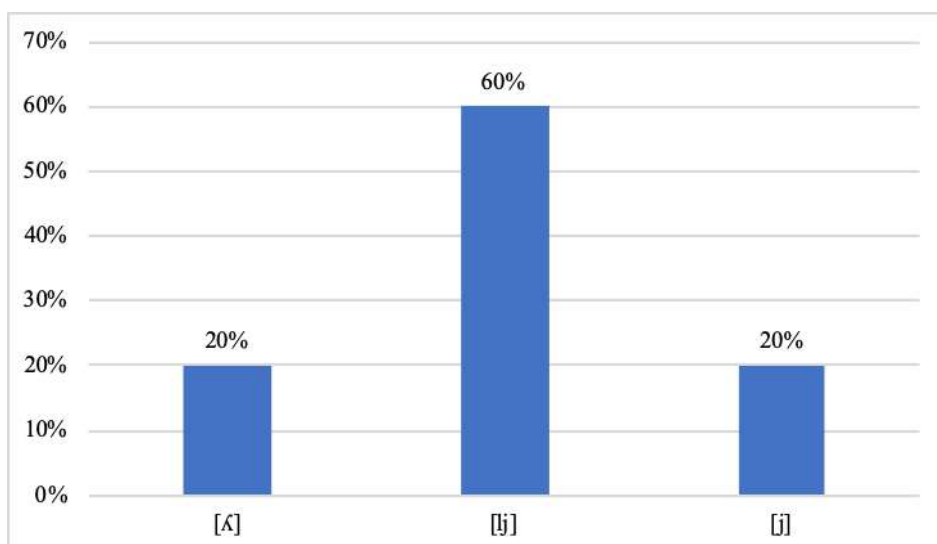


Figure 2. Percentage type of production of target sound [ʎ] by English-speaking learners of Italian

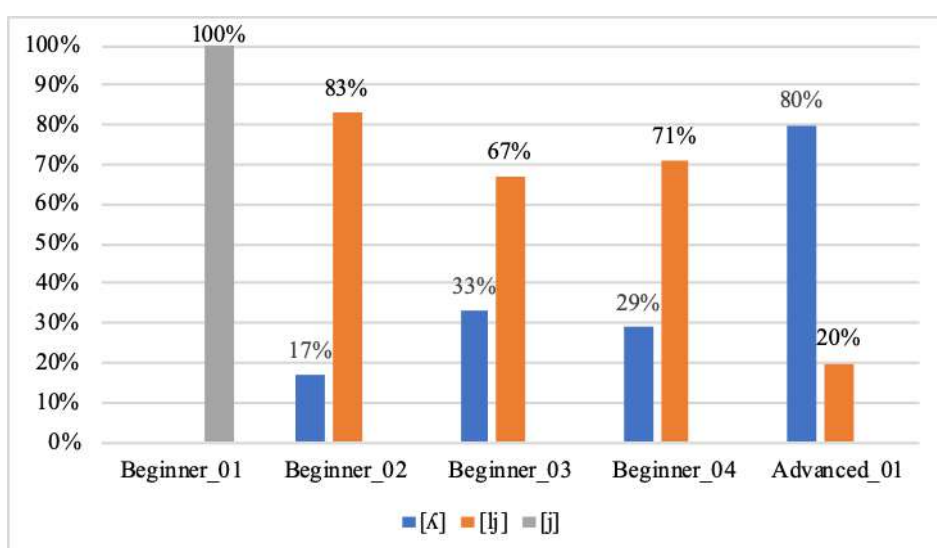


Figure 3. Percentage type of production for [ʎ] by individual English-speaking learners of Italian as an L2

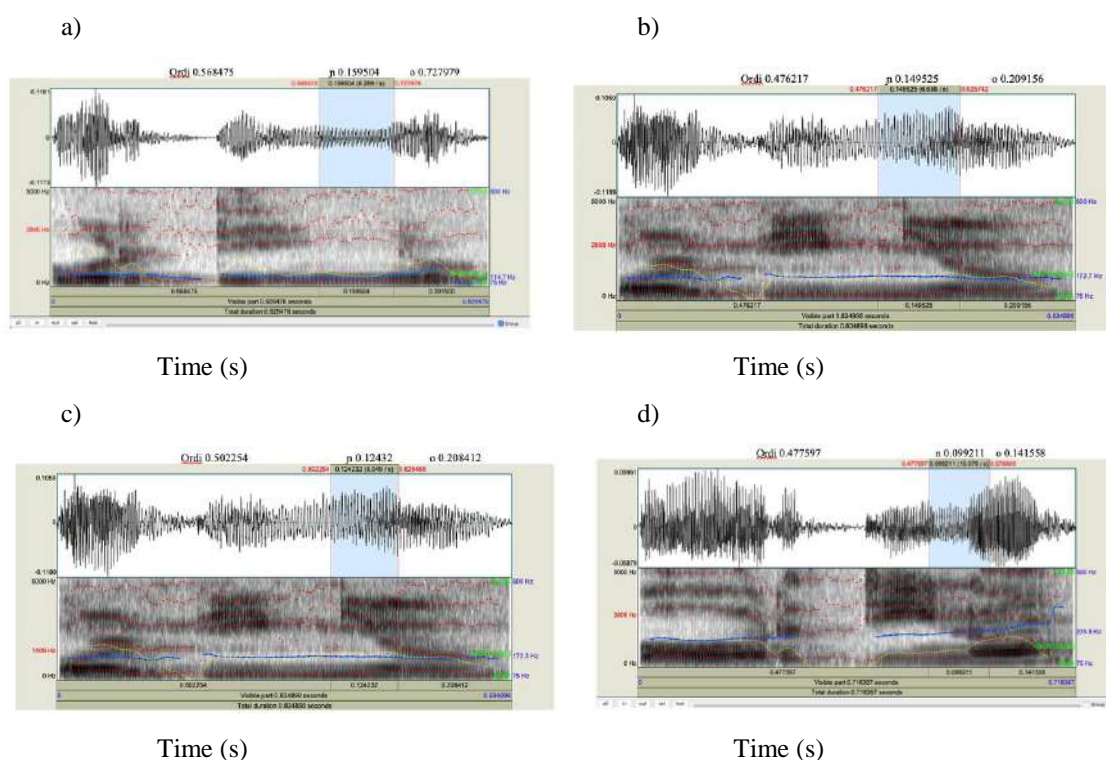
We also analyzed the results to examine whether the participants' level of proficiency affected their L2 production of the target sounds. As Figure 3 shows, beginner learners had difficulty producing [ʎ]. Specifically, beginner learners exhibited a low rate of [ʎ] production (between 0 to 33%) and a high rate of [lj] production (67% to 83%). Moreover, one individual had a 100% [j] production. On the other hand, the advanced learner exhibited a distribution of 80% [ʎ] and 20% [lj] in their production.

We examined whether the learners had difficulty acquiring some of the acoustic features of [ʎ]. Table 1 indicates the F1, F2, F3 and F4 values for the native speakers and for the English-speaking learners, when the participants' productions sounded like a [ʎ]. The results indicate that the formant values differed between the two groups for all the formants. This was particularly true for F1 and F2, where the English-speaking learners' values were almost 1.5 times higher than their native counterparts. In other words, the learners had more difficulties with the height and backness of [ʎ].

**Table 1. Formant values for the target sound [ʎ] produced by English-speaking learners of Italian**

	Native Speakers	English-speaking Learners
F1 – height	299 Hz	457 Hz
F2 – backness	1803 Hz	2347 Hz
F3 – roundness	2734 Hz	2987 Hz
F4 – naturalness	3858 Hz	3527 Hz

Regarding [ɲ] production, a number of different productions were also noted. Figure 4 presents four spectrograms of the word <ordigno> [or.'di.ɲo] ‘bomb’, where the highlighted area corresponds to the target sound [ɲ].



**Figure 4. Sample waveforms and spectrograms of the word <ordigno>, [or.'di.ɲo], ‘bomb’. The highlighted area corresponds to the Italian voiced palatal nasal [ɲ]. (a) is an Italian native speaker (159 ms); (b) is a [ɲ] by an advanced English-speaking learner of Italian (149 ms); (c) is a [ɲj] sequence produced by a beginner English-speaking learner of Italian (124 ms); (d) is a [ɲ] produced by a beginner learner of Italian (99 ms)**

Similarly to the productions of [ʎ], the productions of [ɲ] by Italian L2 learners of English included non-target-like productions (see Figure 5). However, there was a higher rate of [ɲj] sequences (75%). Recall that in the production of [ʎ], the learners mainly realized the target sound [ʎ] as the

approximant [j] when they produced [ʌ] as a single segment. In the case of [ɲ], learners produced it as [n] (5%) and never as a [j]. The rest of the productions consisted of [ɲ] (20%).

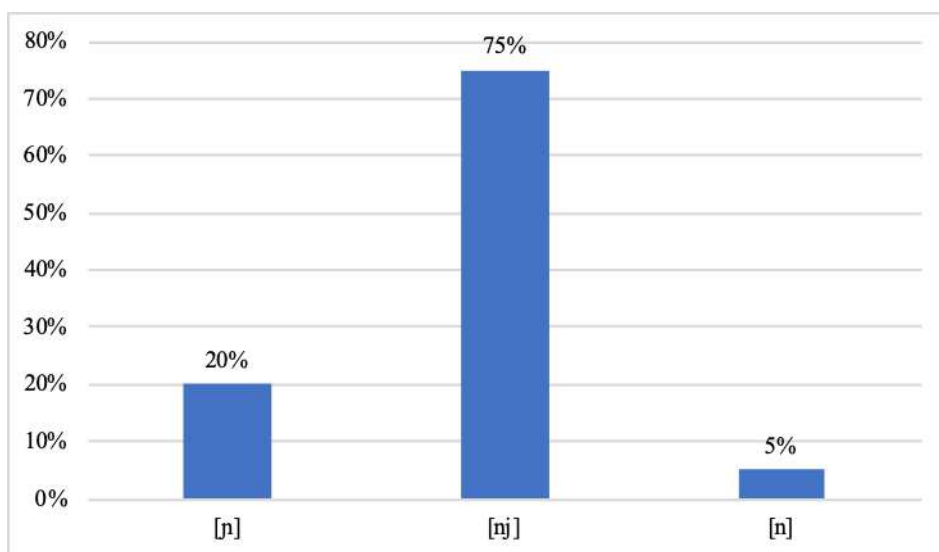


Figure 5. Percentage type of production of target sound [ɲ] by English-speaking L2 learners

We also analyzed the effect of proficiency on [ɲ] production. Figure 6 illustrates that the beginner learners exhibited a low rate of [ɲ] production (0-33%) but a high rate of [ɲj] production (67-75%). For one beginner learner, [ɲ] was also produced as [n] at a 5% rate. The advanced learner, on the other hand, had an 86% rate of [ɲ] production and a 14% rate of [ɲj] production.

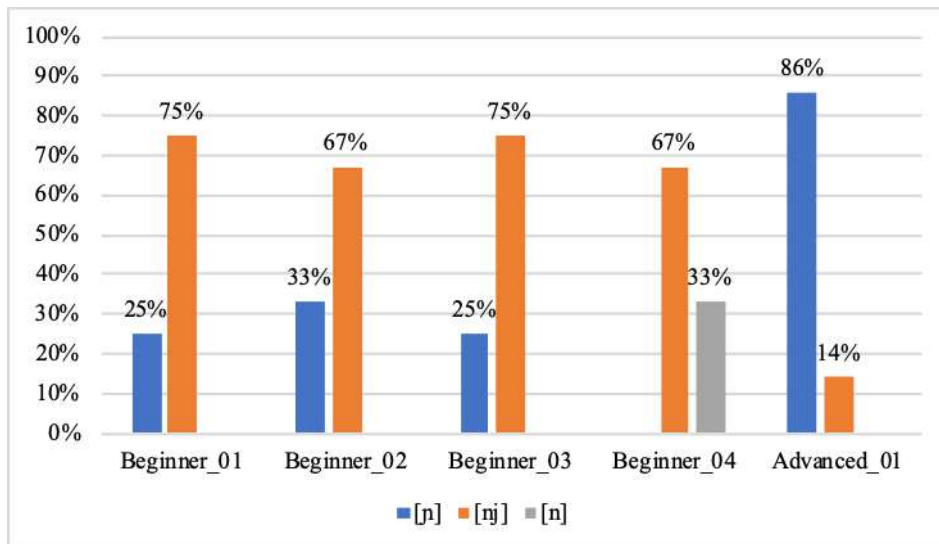


Figure 6. Percentage type of production for [ɲ] per individual

Table 2. Duration values for the target sound [ɲ].

	<i>Native Speakers</i>	<i>English-speaking Learners</i>
Mean duration	181ms	167ms

Mean voiced palatal nasal [ɲ] duration is reported in Table 2. The duration of [ɲ] was measured, when the participants' productions sounded like a voiced palatal nasal. The mean [ɲ] duration is shorter for the learners (167ms) in comparison with the native speakers (181ms).

## Discussion

The first hypothesis in this study stated that English-speaking learners would have difficulty acquiring [ʎ] and [ɲ]. Specifically, it was predicted that [ʎ] would either be mapped onto [l] or [j], and [ɲ] to [n] or [ɲ]. It was also predicted that English-speaking learners would produce the target sounds as sequences of two sounds that existed in English (i.e. [lj] for [ʎ] and [nj] for [ɲ]). Our results indicate that whereas the advanced learner exhibited a high rate of both [ʎ] and [ɲ] production and some non-target sequences, the beginner learners mostly produced a sequence of sounds for the target sounds. Moreover, [j] production was attested for one beginner learner at 100% and [n] for another beginner learner at only a 5% rate.

The high percentage of sound sequence productions in our data suggests that a marked L2 sound may be realized as a sequence of sounds that already exist in the L1. In this case, the English sequences [lj] as in <million> ['mɪljən] and [nj] as in <union> ['ʌnjən] are both highly frequent. Another factor to consider here is the effect of orthography. Rafat and Stevenson (2017) also reported production of the sequence [lj] by naïve English-speaking learners of Spanish when the participants were exposed to both auditory and orthographic input. They attributed this type of combination productions to auditory and orthographic input integration resulting in a McGurk-like effect (see McGurk & McDonald, 1976).

It was also predicted that the learners would not sound target-like with respect to the production of the acoustic features of the target sounds. Our results indicated that the learners were indeed not target-like from an acoustic point of view. Regarding [ʎ], F1 (height) and F2 (backness) proved to be more difficult. The fact that some acoustic features may be more difficult to learn for some L2 learners than others, was previously shown by Colantoni and Steele (2008).

Our results also indicate that [ɲ] productions of English-speaking learners were shorter than their native speaker counterparts. Although, some previous research has suggested that length is a feature that learners tend to acquire (Escudero, 2001; Ruiz-Peña, Sevilla, & Rafat, 2017), other studies have shown that learners have difficulty acquiring length in a target-like manner (e.g. Cordero et al. 2017).

## Theoretical implications

Most studies regarding L2 acquisition have focused on perception (Best & Tyler, 2007; Flege, 1995; Escudero, 2005), rather than production (Colantoni and Steel 2008). Here we tested Flege's (1995) SLM, which is a phonetic model. What this model has in common with the other models is that it predicts that an L2 sound may only be assimilated into another sound but not to a sequence of sounds. However, the findings in the current production study show that it is also possible for L2 learners to produce an L2 sound as a sequence of two existing L1 sounds. Therefore, future models of L2 speech learning need to take into account the possibility that a difficult/marked L2 sound may be mapped onto or produced as a sequence of two existing L1 sounds.

## Conclusion

This is the first study to report the production of Italian [ʎ] and [ɲ] by English-speaking learners of Italian. Our findings suggest that both sounds are difficult for English-speaking learners of Italian during the initial stages of acquisition, where the learners realize them as a sequence of L1 sounds. We have also highlighted the importance of this finding in terms of how it needs to be incorporated into models of L2 speech learning. In addition, we have shown that learners did not exhibit a target-

like production of the acoustic features of the two sounds examined in this study. Our findings make an empirical contribution to the field of L2 speech learning, in particular, with respect to learning Italian as an L2. We are aware that one of the limitations of the study is the sample size and the lack of statistical analysis. We also suggest that future studies examine the perception of these sounds and investigate the effect of orthography.

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# **An investigation of articulatory skill in monolingual and bilingual speakers**

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**Abstract.** A vast amount of experimental data has revealed certain cognitive consequences of bilingualism, some of which have been collectively, although controversially, referred to as the ‘bilingual advantage’. Among these, phonetic and phonological learning (expressed as the ability to learn new sound patterns in an accent never heard before) has been recently found to be enhanced in bilingual speakers compared to monolingual ones. Most of the previous work attempting to uncover the mechanisms underlying the cognitive advantages of bilingualism has focused on executive function. When considering phonetic and phonological learning, however, we are faced with greater involvement of sensorimotor mechanisms, since audition, perception, and articulation are all important components in the learning of new patterns of pronunciation. This underscores the need for investigating alternative mechanisms that could support the cognitive differences resulting from language experience of various types. In the current study, we investigated articulatory skill in monolingual and different types of bilingual speakers using a tongue-twister task. Our results show that while there are no overall differences in accuracy between the two main groups (monolingual vs. multilingual), bilinguals who were first exposed to their second language later in life (typically in their teens) do exhibit an advantage in the articulation of tongue-twisters. Our study thus stands out in having found an advantage with sequential bilinguals, but follow-up studies are needed to understand this phenomenon.

**Keywords:** bilingualism, articulation, bilingual advantage, phonetic and phonological learning

## **Introduction**

The effects of bilingualism on cognition have been examined in both behavioral and neuroimaging studies, and the resulting picture is that bilingualism is particularly beneficial to cognitive development in childhood and in preventing the rate of cognitive decline in dementia in old age (Bialystok, Craik, & Luk, 2012). The bilingual advantage may also be maintained throughout adulthood and involve the skill of learning new languages or dialects (Cenoz, 2003). Recent findings in the field of bilingual cognition suggest enhanced phonetic and phonological learning ability (as reflected by more effective learning of a novel accent after initial exposure) in bilinguals compared to monolinguals (Antonioni, Liang, Ettliger, & Wong, 2015; Spinu, Hwang, & Lohmann, 2018; Tremblay & Sabourin 2012). The positive effects of bilingualism have also been found for novel word acquisition (Kaushanskaya & Marian, 2009), and vowel space restructuring when learning novel accents (Kondratenko & Spinu, 2014). These advantages are thought to lie beyond the explanatory power of a single process, cognitive ability, or a simple neural network (Bialystok, Craik, Klein, & Viswanathan, 2004; Bialystok et al., 2012, Crinion et al., 2006).

Given the diversity of language learning circumstances, the bilingual mind constitutes one of the most readily available sources enabling systematic inquiry into how experience modifies cognitive function. While other cognitive differences between these two groups have been identified in the past (sometimes discussed in terms of a ‘bilingual advantage’ although the term has recently been losing popularity, Marzecová, 2015), the most frequently investigated mechanism potentially underlying them has been executive function (Bialystok 2018), in particular attention/inhibition mechanisms. A general conclusion has been that bilingual advantages stem from enhanced ability to actively select relevant information and suppress potentially interfering information (Anderson, Chung-Fat-Yim, Bellana, Luk, & Bialystok, 2018). When considering phonetic and phonological learning, however, we are faced with greater involvement of sensorimotor mechanisms, since audition, perception, and



articulation are all important components in the learning of new patterns of pronunciation. This points out the need for investigating alternative mechanisms that could support the cognitive differences resulting from language experience of various types.

Recently, approaches focusing on additional mechanisms potentially underlying the bilingual advantage have emerged (see Higby, Kim, & Obler, 2013 for a review). For example, the role of sensory mechanisms was posited to have been underestimated to date and, in particular, auditory sensory (echoic) memory (Calabrese, 2012; Spinu et al., 2018). Bilinguals were shown to have improved function regarding auditory processing of linguistic stimuli (Krizman, Marian, Shook, Skoe, & Kraus, 2012) and to perform better than monolinguals in tasks involving episodic memory recall (Ljunberg, Hansson, Andrés, Josefsson, & Nilsson, 2013), and working memory (Signorelli, Haarmann, & Obler, 2011), but the question whether their auditory sensory memory also differs from that of monolinguals remains open.

Adding to these, the possibility also arises that the bilinguals' advantage in phonetic learning may, at least in part, be due to superior motor control, as their articulators have had daily practice with more than one set of sounds since early childhood. In a sense, bilinguals could be said to have more 'athletic' articulators. As the main articulator, the tongue would be expected to exhibit such advantages most clearly (Browman & Goldstein, 1992). The main purpose of the current study is to initiate this area of research by determining whether articulatory differences exist between mono- and bilinguals through the analysis of tongue-twister production, following Goldrick and Blumstein (2006), and McMillan and Corley (2010).

## Experiment

Since to our knowledge this study is the first to address the question of articulatory skill in monolingual and bilingual speakers, our predictions are primarily based on previous results for tasks involving phonetic and phonological learning (Antoniou et al., 2015; Kondratenko & Spinu, 2014; Spinu et al., 2018; Tremblay & Sabourin, 2012). Because these studies have found a bilingual advantage in both the production and perception of novel sounds and sound patterns, we hypothesize that bilinguals will exhibit a similar advantage in terms of articulatory skill.

*Hypothesis:* Bilingual speakers will display enhanced articulatory control, expressed as overall accuracy or correct pronunciation in tongue twister production.

### Stimuli

For this experiment, the participants read 64 tongue-twisters to a controlled beat of 150 beats per second provided by a metronome. To avoid issues related to language dominance, the tongue twisters consisted of simple nonsense syllables already proven to induce pronunciation errors in the lab, e.g. *kif tif tif kif*, or *zom dom dom zom* (Goldrick & Blumstein, 2006; McMillan & Corley, 2010).

The tongue-twisters, each consisting of 4 syllables, were created following McMillan and Corley (2010). Pairs of onsets (i.e. initial consonants within a syllable, e.g. 'k' in *kef*) were selected from the four stop consonants /k, g, t, d/, resulting in sequences in which the onsets differed by place of articulation, voicing, or both. One vowel was chosen for each tongue-twister from the set /i, e, ʌ/; the different combinations resulted in four versions of the sequence, one in ABBA and one in BAAB order, and one each with the coda /f/ or /v/. The coda refers to the final consonant(s) within a syllable, e.g. 'f' in *kef*. The sequences were transcribed orthographically in the following way: the onsets /k, t/ and the vowel /i/ were used to create the four sequences *kif tif tif kif*, *tif kif kif tif*, *kiv tiv tiv kiv*, and *tiv kiv kiv tiv*. In all, 15 onset-vowel combinations were used, resulting in 60 tongue-twisters. As in the original study, we also included control sequences without any alternation, consisting of four repetitions of the onset together with an arbitrary vowel and coda (e.g. *kef kef kef kef*). The final list to be read thus contained all 64 items. The full list of stimuli is provided in the Appendix.

### ***Participants***

The participants were 40 undergraduate students at Kingsborough Community College (City University of New York). The group contained 20 males and 20 females, mean age = 21.2. They were all tested individually in a quiet room located on campus, in Brooklyn NY. As compensation for taking part in the experiment, each participant received a \$10 Amazon gift card.

The following groups of speakers were identified post-experimentally:

- Monolingual (n=19)
- Early bilingual (n= 8): age of acquisition of second language between birth and 5 years
- Mid bilingual (n= 5): age of acquisition of second language between 5 and 10 years
- Late bilingual ((n= 3): age of acquisition of second language between 10 and 15 years
- Trilingual (n= 5): typically early bilinguals who also learned a third language later in life

### ***Procedure***

The experimental procedure consisted of the following stages:

1. **Demographic questionnaire** (instructions and administration), specifically the LEAP-Q (Marian, Blumenfeld, & Kaushanskaya, 2007)

2. **Practice.** The Microsoft PowerPoint software was used to show participants a sequence of four syllables (e.g. *kif tif tif kif*) centered on a computer monitor in black type on a white background. Each sequence was shown alone on a slide, and the subjects were instructed to read it in a fast tempo, matching 150 beats per second which were audibly marked by a metronome. The participants were instructed to read one syllable per beat and to read each sequence three times. If mispronunciations occurred, they were told to continue reading until the three repetitions of each item were finished. The experiment was self-paced: once a stimulus was read three times, the participants pressed a button on the keyboard to advance to the next item. The practice session consisted of 10 stimuli, followed by the experimental block.

3. **Testing.** The testing session was identical to the practice session, except that the participants proceeded on their own without any explanations, under the supervision of the experimenter. The experimental block included 64 items, which had been previously randomized using the RAND() function of the Excel software.

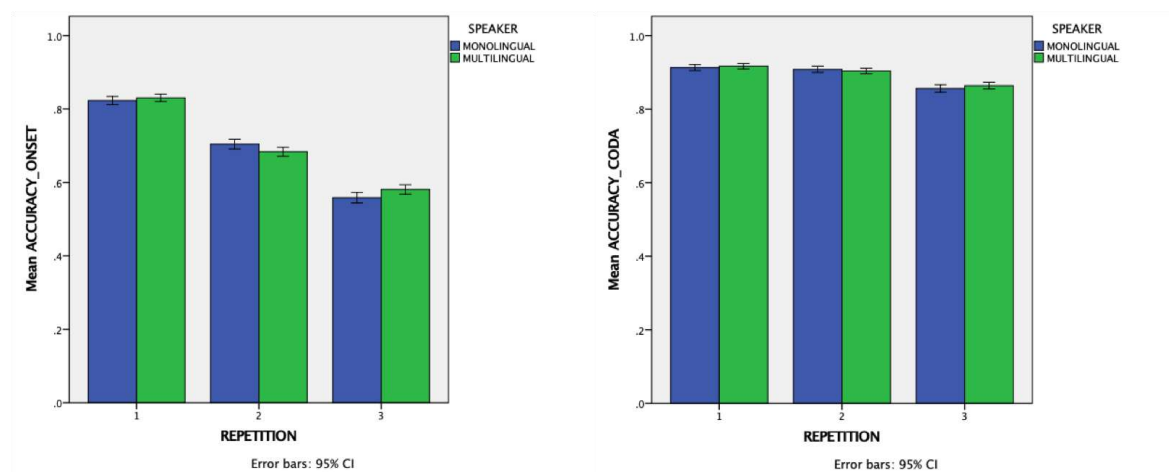
### ***Analysis***

The sequences produced were manually inspected by the first author. Each oral production was matched against the orthographic sequence to which it corresponded. Any errors in pronunciation as well as any hesitations were recorded. Each single syllable received an accuracy score of either 1 (if produced in accordance with the orthographic sequence) or 0 (if any mispronunciations or hesitations were present). To investigate the effect of bilingualism on articulatory skill, a General Linear Model analysis of variance was conducted with Speaker (monolingual/multilingual) and Repetition (first/second/third) as independent variables and Accuracy as the dependent variable. To further understand the role played by different degrees of multilingualism, the analysis was then repeated with Speaker Type (monolingual/early bilingual/mid bilingual/late bilingual/trilingual) and Repetition as independent variables and Accuracy as the dependent variable. The finer grained information related to speaker type was obtained based on the analysis of the responses to the LEAP-Q questionnaire which had been administered to each subject. The different bilingual categories were assigned as described above in the Participants section.

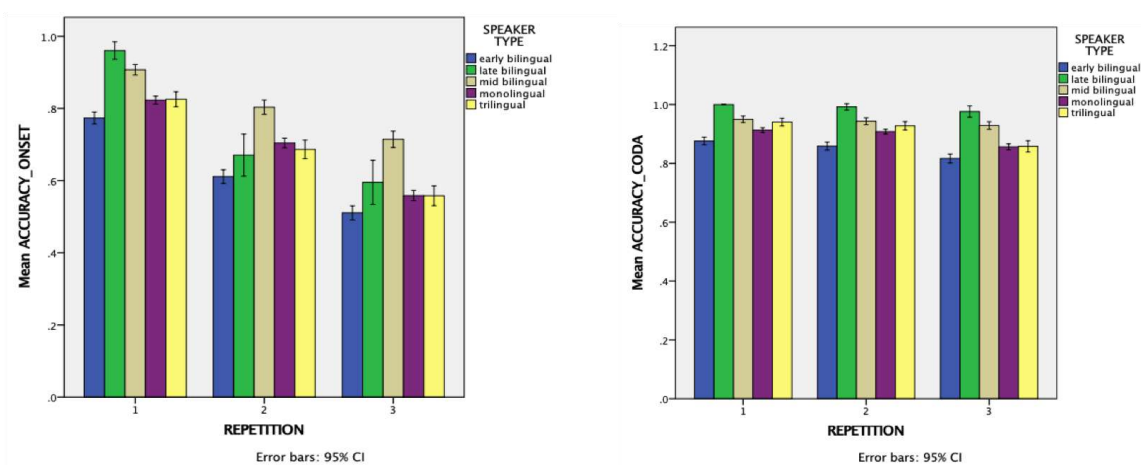
### ***Results***

Figure 1 shows the mean accuracy for each repetition by consonant type (onset consonants on the left side, and coda consonants on the right side). Three main generalizations can be formed based on these

results: (1) that onset consonants are overall more vulnerable than codas, yielding decreased accuracy across the board, (2) that for the onset position, each consecutive repetition is more problematic, with most of the errors found in the third repetition, and (3) that no major differences exist between the monolingual and multilingual group. The descriptive statistics were validated by the ANOVA test we conducted, which showed no significant effect of Speaker. By contrast, there was a significant effect of Repetition ( $p < .05$ ).



**Figure 1. Mean accuracy for onsets (left) and codas (right) for each repetition**



**Figure 2. Mean accuracy for onsets (left) and codas (right) for each repetition, broken down by speaker type (monolingual, early/mid/late bilingual, and trilingual)**

Figure 2 provides the same information as Figure 1, this time broken down by speaker type in terms of the specific bilingual or trilingual experience of each participant. To further understand the role played by the specific type of multilingual experience, we conducted a second GLM ANOVA replacing Speaker (monolingual/multilingual) by Speaker Type (monolingual/early bilingual/mid bilingual/late bilingual/trilingual) as an independent variable. Two of the main patterns noted with Figure 1 (i.e. higher vulnerability of the onset position compared to the coda and decreased performance with each additional repetition, such that the third repetition was associated with the highest number of onset errors) were observed with all groups of speakers. In terms of the different speaker groups, the new analysis revealed a significant effect of Speaker Type ( $p < .001$ ) as well as Repetition ( $p < .001$ ) on both onset and coda accuracy. As Figure 2 shows, the mid and late bilinguals exhibited the highest accuracy rates across the board. A post-hoc analysis with the Bonferroni

correction showed that for the onset position all groups were significantly different from each other, with the exception of monolinguals and trilinguals whose performance did not differ significantly. All groups differed significantly from each other for the coda position. Finally, in the onset position, all three repetitions differed from each other significantly, while in the coda position the third repetition differed significantly from the first and the second, which did not differ significantly from each other.

## Discussion

Our results partially support the hypothesis formulated above. While no significant differences were found between the monolingual and multilingual group overall, differences did emerge when the multilingual group was broken down into different subgroups depending on the specific type of multilingual experience possessed by each. Mid and late bilinguals outperformed all other groups in terms of articulatory skill, exhibiting the highest accuracy rates across the board, including in the most vulnerable positions noted (onset consonants during the third repetition of an item). The effect of bilingualism on sensorimotor mechanisms thus promises to be a fruitful avenue for research. Bringing together multiple components (motor, sensory, and attentional) and investigating their relationship with phonetic ability has the potential to enable a uniquely rich perspective on the phenomenon of phonetic and phonological learning. This will lead to a greater understanding of why and in what specific ways some individuals are good at learning sound patterns in novel accents while others are not.

Crucially, our findings emphasize the need for a reconceptualization of bilingualism as a multifaceted construct made up of continuous variables rather than a dichotomous category (Sulpizio, Del Maschio, Del Mauro, Fedeli, & Abutalebi, 2019). Even though bilingualism has been treated for decades as a categorical experience in order to accommodate the requirements of experimental design, in reality, it reflects a much more complex, multidimensional, and dynamic construct (Bialystok, 2018). Supporting these observations, recent literature on the neurobiology of bilingualism (DeLuca, Rothman, Bialystok, & Pliatsikas, 2019; Del Maschio & Abutalebi, 2018) suggests that proficiency, rather than age of acquisition, is the critical differential factor in the functional organization of bilingual language processing. Even more recently, second language age of acquisition, proficiency, and usage were all found to modulate the functional connectivity of language and control networks in the brain, with the effect of age of acquisition being modulated by both proficiency as usage.

A third interesting aspect of our study is that we have found positive effects of bilingualism with young adults in the mid/late bilingual category. Both of these groups (young adults and late, sequential bilinguals) are typically least likely to differ from monolingual speakers when tested on various cognitive aspects and, even when differences are found, they are often not replicated in follow up studies (Bialystok, 2018; Bialystok et al. 2012; Marzecová, 2015). As mentioned above, the lack of replicability of such studies is thought to arise from the difficulty of quantifying the bilingual experience (Del Maschio & Abutalebi, 2018), but also from the fact that some of the posited advantages of bilingualism are thought to be (1) a property of early bilinguals who have learned two languages simultaneously from birth and (2) most evident in childhood and old age, but 'muted' in adulthood (Bialystok et al. 2012). Our study suggests that there are at least some aspects in which sequential bilingualism might result in beneficial effects on cognition.

The most important limitation of our study is the limited number of participants examined, particularly as a result of dividing the multilingual group into subcategories. Consequently, we can draw no strong conclusion based on the findings reported here, and we propose that future work addresses these issues using larger samples of speakers. A welcome avenue of research involves imaging of the articulators through the use of ultrasound or MRI instrumentation, which have both become more available to phonetic research in recent years and provide safe and effective methods for visualizing structures inside the body, such as the tongue, larynx, palate and other articulators employed in speech. In particular, such studies should employ a more nuanced, multidimensional way of assessing bilingual knowledge and incorporating it into an experimental design. Lastly, future work

should also be aimed at determining the extent to which results such as ours may reflect motoric rather than planning difficulties (McMillan & Corley, 2010).

## Conclusion

Our study was among the first to focus on differences between monolinguals and multilinguals in terms of sensorimotor aspects. We have found a bilingual advantage in articulatory skill as expressed in tongue twister accuracy during a fast production task elicited through the use of a metronome. Contrary to expectations, the advantage was restricted to a specific subset of bilingual speakers, namely those who had acquired their second language in their mid and late teens. These findings open new directions of research and underscore the importance of directly measuring bilingual language proficiency and incorporating this information to experimental design. In line with very recent work, this approach will help us determine the extent to which factors in addition to the more commonly used self-reported information (such as age of acquisition, type of exposure, and amount of language use) modulate behavioral findings in the field of bilingual cognition.

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## Appendix

Full list of stimuli used in the experiment (following McMillan and Corley 2010):

1 kefkefkefkef	17 divkivkivdiv	33 kevgevgevkev	49 kefteftefkef
2 givkivkivgiv	18 tufgufgufuf	34 gifdifdifgif	50 dufgufgufduf
3 kiftiftifkif	19 tuftuftuftuf	35 difkifkifdif	51 gevkevkevgev
4 duvkuvkuvdudv	20 defkefkefdef	36 tevgevgevtev	52 kivgivgivkiv
5 guvtuvtuguv	21 tivkivkivtiv	37 devgevgevdev	53 kifdiftifkif
6 tuvguvuvtuv	22 kevtevtkev	38 tifgiftif	54 gufkufkufguf
7 defgefgefdef	23 dufkufkufdudf	39 kuvguvuvkuv	55 givtivgiv
8 kuftuftufkuf	24 kevdevdevkev	40 divgivgivdiv	56 gevdevdevgev
9 tivgivgivtiv	25 givdivdivgiv	41 gefteftefgef	57 tifkiftif
10 tufkufkufuf	26 gefkefkefgef	42 tefkeftef	58 guvduvduvguv
11 gifkifkifgif	27 duvguvuvdudv	43 tevkevkevtev	59 gevtevtgev
12 devkevkevdev	28 gufdufdufuf	44 givgivgivgiv	60 kivdivdivkiv
13 giftiftifgif	29 tuvkuvkuvuv	45 kuvduvduvkuv	61 guvtuvtuguv
14 guftuftufguf	30 kivtivkiv	46 kifgiftif	62 kuvtuvatuvkuv
15 difgiftifdif	31 kefgefgefkef	47 gefdefdefgef	63 duvduvduvduv
16 kufdufdufkuf	32 kufgufgufkuf	48 tefgefgef	64 kefdefdefkef

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## **Influence of reading acquisition on the choice of referring expressions in children's narratives**

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**Abstract.** The study explored the impact of reading acquisition on children's use of referring expressions in narratives. Young children use deictic expressions in storytelling (Karmiloff-Smith, 1981, 1985), meaning that they sometimes introduce a new character with a pronoun, whereas older children and adults often prefer a noun phrase (Jisa, 2000). At around 6-7 years old, they contrast more systematically the referring expressions used for newness or giving (Bamberg, 1986; Hickmann, 2002). At this age, they also begin formal reading instruction. Written texts, which rely on a rigid respect of cohesion rules, offer children a new visual model of referential uses that could contribute to the development of referring abilities. This hypothesis is also suggested by the fact that children with dyslexia struggle to manage cohesion in narratives (Préneron, Salazar Orvig, Kugler-Lambert, & David, 1995). We video-recorded three groups of ten French-speaking children aged 4-4½, 5-5½, 6-6½ for two years and obtained six narrative sequences based on picture books. Children's reading level was assessed regularly. We analyzed the choice of referring expressions according to their position on the referential chain (first mention, maintaining or reactivation) and observed whether referential uses changed in connection with the evolution of the children's reading level. Results showed that, for the same position in the referential chain, readers gradually chose among a reduced variety of referring expressions, while non-readers of pre-school age tended to use a wider range of forms, leading more frequently to ambiguities. Statistical analyses revealed that the ability to express reference was more correlated to reading fluency, even for earlier readers. Discussion will focus on the possible concurrent factors, such as literacy and cognitive development, accounting for the evolution of pragmatic-discourse abilities.

**Keywords:** referring expressions, storytelling, reading acquisition

### **Introduction**

This study is based on some contrasts in the acquisition of reference. Indeed, research on the use of referring expressions among children shows on one hand that they are able to refer and maintain attention on entities quite early in their development (Serratrice & Allen, 2015). They begin by pointing, they name other people and things and then they include these people and things in a succession of utterances creating a discourse. Before the age of 3, they have accurate skills to use referring expressions in dialogue, when the referential chains are co-constructed with adults (Allen, Hughes, & Skarabela, 2015; Hickmann, 1996; Salazar Orvig, Marcos, Morgenstern, Hassan, Leber-Marin, & Parès, 2010). On the other hand, when children produce longer sequences of speech such as narratives, without adults' scaffolding, they seem to struggle with the mastery of all the pragmatic devices to clearly express reference to entities (Bamberg, 1986; Hickmann, 2002; Jisa, 2000; Jisa, Chenu, Fekete, & Omar, 2010; Karmiloff-Smith, 1981, 1985). It is not surprising that managing referential chains during preschool age in dialogue is easier than in narratives, which are acquired later on. Storytelling requires short term memory in order to create referential chains involving characters and inanimate entities in the story, which may be difficult for 3 or 4 year-old children.

Moreover, children need to acquire the pragmatic abilities to take into account what their interlocutor knows about the story and adapt the chosen forms in order for them to be clear and transparent. The Karmiloff-Smith's model of the development of reference in narratives between 4 and 9 years old shows that the first uses of referring expressions are deictic and gradually evolve to anaphoric (Karmiloff-Smith, 1981, 1985). Young children's narratives are marked by a "here and now"

anchorage because they do not really choose the forms based on the linguistic content of their speech but according to the linguistic tools at their disposal to mention referents in utterances (Hickmann, 2002). Thus, they randomly choose long forms such as noun phrases or short forms such as pronouns in various contexts, whether the last mention of the referent is close or not. Older children acquiring anaphoric strategies, prefer using personal pronouns to maintain a referent in the same syntactic position from an utterance to another. They also tend to use noun phrases in contexts where several referents previously mentioned are in competition (Hickmann, 2002; Jisa, 2000; Karmiloff-Smith, 1985). There are major evolutions from the age of 6, even cross-linguistic studies show it (Hickmann, 2002, 2004; Jisa et al., 2010; Karmiloff-Smith, 1985).

In many countries and in many languages the age of 6 corresponds also to the emergence of formal reading instruction which is a key-step in the child's linguistic development. Some studies, although they are not especially focused on reference or on oral storytelling, show a link between literacy development and discourse organization (Berman, 1988; Botting, 2007; Dickinson & Snow, 1987; Tolchinsky & Rosado, 2005). Moreover, children with dyslexia adopt deictic strategies until a later age compared to their typically developing peers (Kugler-Lambert & Préneron, 2010; Préneron et al., 1995). This phenomenon could be related to a specific cognitive deficit present among children with dyslexia, but this delay in the mastery of reference in narratives could also be related to their lack of reading experience, since dyslexia is not supposed to affect oral language. Based on the fact that reading instruction could impact the evolution in the choice of referring expressions between 4 and 8 years old we know that written language is mostly based on anaphora rules that could be an influence for the newly reader concerning the use of referring expressions. In addition, written language is a visual model of the construction of referential chains in discourse. Before being literate, children only benefit from oral models on the use of referring expressions. Thanks to these visual representations, they may acquire a better mastery of the pragmatic function of the different linguistic forms used to refer. Therefore, in this study, we interrogate the relations between the decrease of deictic uses of referring expressions from the age of 6 and reading achievement.

## **Method**

30 French-speaking children, aged from 4 to 8, participated in a 20-month follow-up study during two school years. Three macro-groups of ten children were created, depending on their age and school level. The first group included preschool children aged from 4 to 6, just before their entrance into primary school, they were considered as preschooler1 and preschooler2 (abbreviated in PRS1 and PRS2 below) in the study. The second group included children from 5 to 7, from Preschool2 to 1<sup>st</sup> grade, and the third group included children from 6 to 8, from 1<sup>st</sup> grade to 2<sup>nd</sup> grade. Thus we combined a cross sectional approach by comparing the groups, and a longitudinal one by doing a follow-up of these children on the way to becoming readers. The follow-up was composed of 6 video-recorded sessions of data collection, so children were asked to produce 3 narratives per school year through face-to-face meetings with the experimenter. Children told stories from picture books. Stories were composed of different referent types with common features such as gender or species for animal characters, so if children still have deictic strategies they wouldn't be as specific as required to distinguish these ambiguous referents. The reading level was assessed at each session; the test included decoding skills scores and a fluency measurement.

## **Coding**

Thus, 180 narratives were obtained and transcribed in CLAN (MacWhinney, 2000). We coded each referring expression used according to the form chosen. We coded cleft structures, dislocations, nouns, third person pronouns and other pronouns. We also coded the syntactic functions of the referring expressions, as well as their position in the referential chain. In addition, for noun phrases, we identified the determiner used (definite, indefinite or other). Finally, we coded the nature of the referent mentioned (animate or inanimate), as whether referents appeared in a competition context with each other. We analyzed the evolutions in the choice of forms between school levels and made

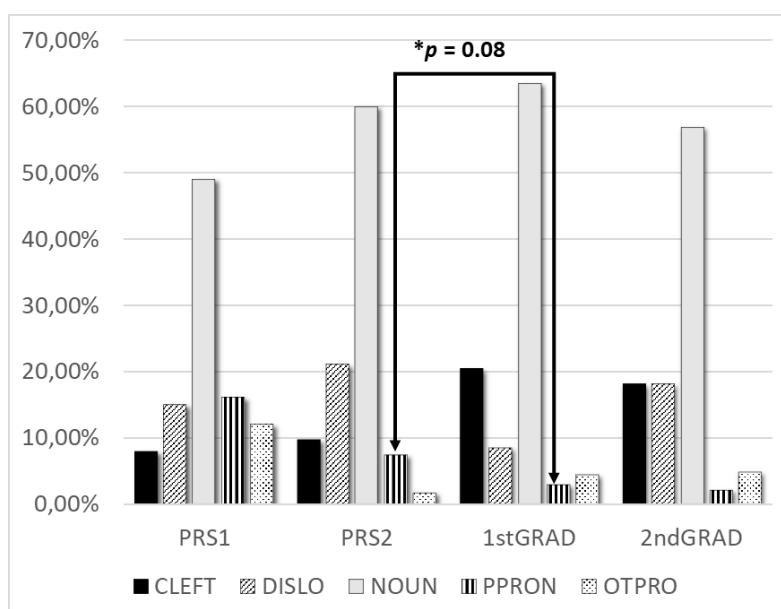


correlation analysis at the individual level between the relevant evolutions and the reading level on one hand and the age on the other hand.

## Results

### *First mentions*

As far as first mentions are concerned - namely what forms children use to introduce a new referent within the story - as expected all groups preferred noun forms for first mention, even if we focused only on animate entities (see Figure 1). However, there is a significant decrease in the use of third person pronouns in first mention (Kruskal-Wallis rank sum test,  $p = 0.003$ ). By comparing the evolution between each school level two by two, the most important decrease of 3<sup>rd</sup> person pronouns appears between PRS2 and 1<sup>st</sup> Grade, even though it is only a tendency (Wilcoxon rank sum test,  $p = 0.08$ ). When children use pronouns in first mention, it is often a subject pronoun in preverbal position, while object pronouns are less frequent.



**Figure 1. Frequency distribution of forms used in first mention for animate entities**

As all children prefer noun forms in first mention, we have also observed what kind of determiners they used in this context (see Figure 2). Indeed the definiteness of determiners has the pragmatic function to express *new* and *given* in discourse (Givón, 1993; Halliday & Matthiessen, 2007; Halliday & Hasan, 2009; Hickmann, 2002). An indefinite determiner is supposed to point out that the referent is new, while a definite article presupposes that the entity is given or accessible. Thus, when speakers use a definite article in first mention, they are closer to a deictic strategy; they consider that the new referent, in first mention, is accessible enough on the basis of the immediate context. There is a significant evolution between groups for the use of definite and indefinite determiners in first mention. We observed a global decrease of definite determiners (see Figure 2), especially among the youngest children (Kruskal-Wallis rank sum test,  $p = 0,007$ ). The use of indefinite determiners significantly increases too (Kruskal-Wallis rank sum test,  $p = 0,01$ ). Once again, if we compare groups two by two, the most important difference appears between PRS2 and 1<sup>st</sup> Graders. 2<sup>nd</sup> year preschoolers use definite articles more frequently in first mention (Wilcoxon rank sum test,  $p = 0.02$ ). They also tend to use less indefinite articles than 1<sup>st</sup> grade children do (Wilcoxon rank sum test,  $p = 0.07$ ).

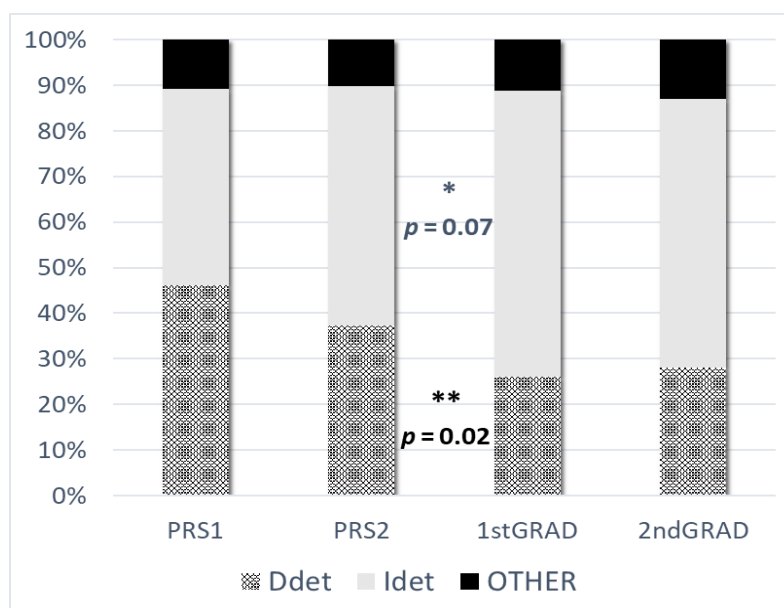


Figure 2. Frequency distribution of determiners in first mention

Even if there are slight differences between readers and non-readers in first mentions - especially for determiners - the age factor cannot totally be excluded. Indeed even if we observe the evolution between school levels, it is undeniable that these children grow up while they are learning to read. Thus, Spearman's rank correlation analysis between the increase of indefinite and the decrease of definite determiners and reading skills on one hand, and the age on the other hand, could specify the impact of the different factors.

Table 1. Correlation between determiners used in first mention, reading level and age

DETERMINER TYPE	READING LEVEL		AGE
	DECODING SKILLS	FLUENCY	
<b>INDEFINITE</b>	0.215 ( $p = 0,23$ )	-0.029 ( $p = 0,86$ )	0.333 ( $p = 0,01$ )
<b>DEFINITE</b>	-0.176 ( $p = 0,33$ )	0.054 ( $p = 0,74$ )	-0.405 ( $p = 0,004$ )

There is neither a correlation between reading level and the increase of indefinite determiners nor a correlation between reading level and the decrease of definite determiners. It seems that the increase of indefinites and the decrease of definite determiners in first mention is mostly related to the age factor, even if correlations are weak (see Table 1). Thus, children tend to use more indefinite determiners when growing up and less definite, and this is more significant for definite articles.

### Second mentions

About second mentions of referents, meaning when an entity previously introduced in the narrative is maintained or reintroduced, we especially focused on high competition contexts, when the referent is in subject position but in competition with another one mentioned in the previous utterance. In these specific contexts, we observed a significant decrease in the use of 3<sup>rd</sup> person pronouns (Kruskal-

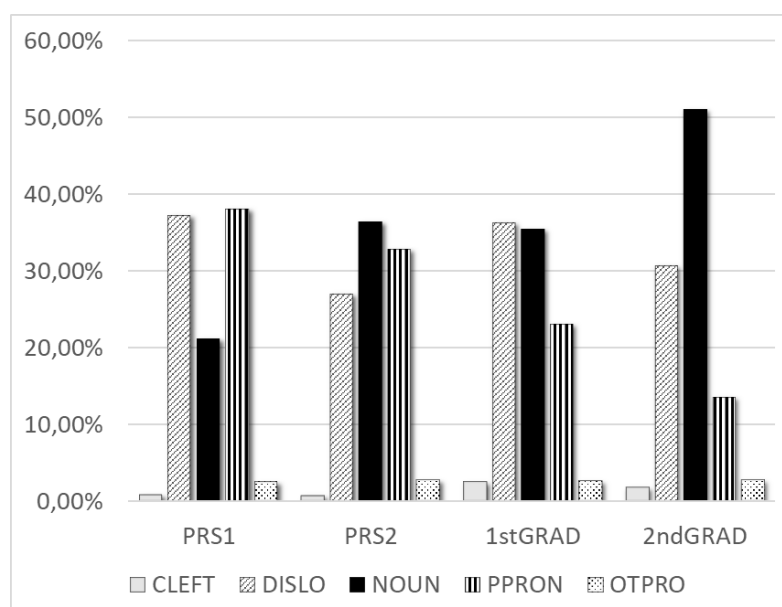
Wallis rank sum test,  $p = 0.004$ ), while there is a global increase in the use of noun forms (Kruskal-Wallis rank sum test,  $p = 0.01$ ) (see figure 3). As illustrated in the example below, these cases of reintroduction by pronoun forms force the interlocutor to focus on the immediate context rather than the content of speech to interpret it. In addition, they are often completed by pointing, as it is the case in the example. Comparison of groups two by two reveals a difference between 1<sup>st</sup> Graders and 2<sup>nd</sup> Graders. First, 2<sup>nd</sup> graders use fewer pronouns than 1<sup>st</sup> graders in competition contexts (Wilcoxon rank sum test,  $p = 0.009$ ). They also tend to use more nouns (Wilcoxon rank sum test,  $p = 0.06$ ).

(1) Baptiste 6:00 – PRS2

CHI et après il est fatigué euh l' ours !  
 CHI *and then [he] is tired hum the bear !*  
 CHI le renard aussi il est fatigué alors i(l) s' endort .  
 CHI *the fox also [he] is tired so he falls asleep .*  
 CHI et après i(l) monte sur la montagne . %com: CHI pointe le renard sur la colline  
 CHI *and then he climbs on the mountain . %com: CHI points the fox on the hill*  
 CHI et après i(l) va dans sa maison . %com: CHI pointe l'ours  
 CHI *and then he goes in his house . %com: CHI points the bear*

**Table 2 Correlation between potentially ambiguous pronouns, reading level and age**

	READING LEVEL		AGE
	DECODING SKILLS	FLUENCY	
<b>PRONOUNS</b>	-0.328 ( $p = 0,06$ )	0.475 ( $p = 0,03$ )	-0.385 ( $p = 0,02$ )



**Figure 3. Frequency distribution of forms for second mentions in competition contexts**

Correlation analysis reveals that fluency is the most correlated factor in the decrease of potentially ambiguous pronouns, among other factors such as age, decoding skills and fluency (see Table 2). There is a positive correlation because the fluency test assessed time to read a text, thus scores decreased parallel to reading progression, as well as the rate of potentially ambiguous pronouns.

Correlations are weak, so we cannot affirm that the relations are strong, but fluency is the most important variable in relation to the decrease of these specific deictic strategies.

## Discussion

The evolutions found in the choice of referring expressions between 4- and 8-year-olds are possibly linked to emerging literacy, considering the qualitative differences between non-readers and new readers in first mentions; and between new readers of 1<sup>st</sup> grade and more experienced readers of 2<sup>nd</sup> grade in second mention, but we never found differences between both preschooler groups. However, reading acquisition is surely one factor among others in reference development. Indeed, the acquisition of reference is not linear, children gradually evolve from one step to the other, and this evolution is marked by acquisition and regression phases and coexistence of both strategies at the same time (Karmiloff-Smith, 1981, 1985; Serratrice & Allen, 2015). Moreover, children acquire the use of referring expressions well before learning to read. All these reasons could explain the fact that the evolution in the choice of referring expressions is weakly correlated with the other factors observed, including age. Even with a follow up methodology, it is not easy to locate the exact time children become literate subjects. Assuming benefits from written language presupposes certain experience with it. First grade children are not completely literate people, they are building decoding skills, but they are not likely to be sensitive to the functional subtleties of written language. As the differences between good readers and poor readers tend to increase with time and experience (Ecalte & Magnan, 2010; Sprenger-Charolles & Casalis, 1996; Sprenger-Charolles & Colé, 2013), it is possible that the development of reference abilities undergoes the same trajectories. This is suggested by the correlation obtained between fluency and the decrease of potentially ambiguous pronouns. Indeed fluency assessment concerned only older children of the study, and this was also the most relevant correlation. Perhaps with a longer follow-up, the correlations would be stronger. Lastly, this study concerned small groups of quite young children in terms of reading acquisition. Groups were not heterogeneous enough to make comparison between poor and good readers of the same age, but these findings encourage carrying on investigation with older long-time literate children.

## Conclusion

Children's reference abilities in narratives are subject to major evolutions when they begin formal reading instruction, while changes are not so fast in preschool age. We globally observed different strategies in narratives between 4- and 8-year-old children. Indeed, referring expressions are less and less used in their deictic function. Children gradually master how to express *new* and *given* in narratives. Therefore, it seems that, for the same position in the referential chain, advanced readers gradually chose among a reduced variety of referring expressions, while younger children tended to use a wider range of forms. That is why we observed a decrease of potentially ambiguous pronoun forms. Correlations between fluency and the decrease of potentially ambiguous pronoun forms suggest that reading ability is linked to the integration of a systematic usage of referring expressions according to the position in the referential chain. Thus, this study should be continued, these first results deserve to be investigated in a wider scale, with larger groups and a wider age range, including children with a delay in reading acquisition compared to their peers.

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## **Narrative skills of bilingual school-aged English-Greek children: Preliminary results**

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**Abstract.** Narrative competency is an important predictor of academic success and a powerful clinical marker of communication impairment. Narratives are also crucial for social interaction in children. Bilingual children are a heterogeneous group with regards to linguistic competency and literacy. Little is known about the attainment of narrative skills in bilingual English (L1)/Greek (L2) children attending schools in both languages in an English-speaking country. Here, we investigated the narrative skills of school-aged children using standardised and comparable story stimuli. While results of a cohort are currently analysed, here we present two school-aged children of Greek origin (a girl aged 7;5 and a boy aged 7;4), residing in an American-English speaking environment and attending school in both L1 and L2, whose narrative skills were assessed using the Renfrew Bus Story (Refrew, 1997) and a Greek adaptation on 2 different occasions within a week. Narrative samples were analysed for information measures, mean length of utterances (MLU, 5 longest utterances), number of subordinate clauses and other qualitative measures. Results showed that children performed within norms in both languages in most cases; yet their profile was dissimilar in specific parameters. In both, higher performance was observed in L1 information score compared to L2, as well as code switching within L2 narration only. Additionally, the pattern of MLU and story length was reversed between L1 and L2 in these 2 children. Results indicate that narrative competency can be attainable in bilingual children attending educational settings covering L1 and L2. Measurements of story-telling could be informative of language production and code-switching mechanisms. Although responses were within the norms, specific measurements allowed distinguishing differences between the two participants of similar age.

**Keywords:** narrative skills, assessment, bilingual children, Greek, English, code-switching

### **Introduction**

There is general agreement among clinicians and researchers that assessment of narrative abilities is indicative of linguistic competence as well as related to academic performance, in the case of both monolingual and bilingual children. Although there are large numbers of bilingual students of Greek origin in the US and other English-speaking countries, their language skills have not been investigated. In this paper, we seek to explore narrative production skills of Greek heritage children and possible variations in performance between the two languages.

Narrative competency is a powerful clinical marker of communication impairment (Botting, 2002), offering a window into spoken language abilities (Silliman & Champion, 2002). Data of oral narratives in both languages spoken by a child can provide an indication of linguistic competence in each language spoken, so as to differentiate between children who may have limited proficiency in one of the languages from children with generalized language difficulties in all spoken languages. (Gutiérrez-Clellen, 2002).

Narratives offer several advantages as a starting point to the assessment of language skills and bilingualism. Assessment of narrative performance is an ecologically valid assessment method, since multiple linguistic levels are simultaneously assessed (Theodorou & Grohmann, 2010). Assessment of spontaneous narrative productions as well as story re-telling provides a rich source of data about a child's language use in a relatively natural context (Gagarina, Klop, Kunnari, Tantele, Välimaa, Balčiūnienė, ..., & Walters, 2015). Narrative structure can be informative on language-specific phenomena, permitting within-subject, cross-language comparisons (Armon-Lotem, de Jong, & Meir, 2015). Finally, narratives enable the observation of phenomena that are unique to bilingual

performance, such as code-switching and cross linguistic interference in spontaneous language production (Gagarina et al., 2015).

Previous studies have reported on a relationship between narrative performance and academic achievement. Children's proficiency with school narrative tasks may significantly predict children's early literacy skills and is an important predictor of academic success (Gagarina et al., 2015). Specifically, oral narrative production may reveal language-based aspects of academic readiness.

So far, little is known about the attainment of narrative skills in bilingual English (L1) - Greek (L2) children attending schools in both languages in an English-speaking country. Normative data in bilingual typically developing children is missing, especially in children whose L2 is the Greek language. Here, we investigate the narrative skills of school-aged children using standardised and comparable story stimuli.

## **Aims of the study**

The study aims to assess and compare language skills in both languages, with a core point on narratives. Specifically, it aims to explore:

1. Children's abilities to produce narratives in L1 and L2
2. Children's profiles of strengths and weaknesses in L1 and L2
3. Any quantitative or qualitative differences in language attainment between languages, specifically, L1 (English) and L2 (Greek)

## **Methods**

### ***Participants profiles***

Our study is based on two school-aged children J, a girl aged 7;5 years and K, a boy aged 7;4 years at the time of testing. Both participants are of Greek origin, residing in an American-English speaking environment (Chicago). The parents of these children are native Greek speakers, born or raised in Greece, living in the United States for a long time. According to parental reports, the Greek language is used at home, however, in the case of the boy, communication in the family is not exclusively in Greek. Both children attend English school curriculum on a daily basis and Greek heritage-language afternoon classes twice a week. Within the Greek school setting formal instruction is given on Greek language and literacy, including grammar, spelling and writing essays. In addition, there are activities related to cultural and religious issues.

### ***Assessment tasks***

Children were assessed on their lexical and their narrative abilities. All verbal measures were elicited with similar or comparable instruments in an individual session for each language, as follows:

1. **Naming accuracy:** Word Finding Vocabulary Test (Renfrew, 1995) and a Greek adaptation (Vogindroukas, Protopapas, & Sideridis, 2009). A productive vocabulary task normed for monolinguals in Greek (Vogindroukas et al., 2009) was used to assess the bilinguals' productive vocabulary proficiency in each language. It is a naming task and includes 50 pictures of nouns. The pictures in the Greek version are presented in a different order than in the English language, corresponding to the Greek norms. The presentation of the pictures for each language was done according to the test manual.
2. **Elicited language production:** Action Picture Test (Renfrew, 1997a) and a Greek adaptation (Vogindroukas, Protopapas, & Stavrakaki, 2009). An elicited language production task, normed for monolinguals in Greek (Vogindroukas et al., 2009) was used to assess the bilinguals ability to form complete and grammatically correct sentences in each language. Ten colourful pictures

accompanied by a simple question are used to stimulate the production of spoken language. The collected sample is analysed in terms of information given and the grammatical structures used. In the Greek version scoring is adapted to the characteristics of the Greek language, for example subject verb agreement is scored.

- 3. Story retelling:** Bus Story Test (Renfrew, 1997b) and a Greek adaptation (Geronikou, 2016). The bus story test (Renfrew, 1997) was used to assess the bilinguals' ability to produce a connected narrative in each language. Initially, the child listens to the researcher telling the story of a bus while looking at accompanying pictures representing the activities. Then the child is asked to look at the same pictures and narrate the story. The ability to give a coherent description of a continuous series of events is analysed in terms of content and grammatical accuracy. The child's story is scored according to the amount of accurate information given, the mean length of utterance and the use of subordinate clauses.

## Procedure

Children were assessed separately in English (L1) and Greek (L2) on two different occasions within a week at a quiet place at a Greek school setting in Chicago, US. Assessments were conducted by the third author, a bilingual speech and language therapy undergraduate student. Data were digitally recorded. Audio recordings were independently transcribed and analyzed by the other authors.

## Results

The performance of the two bilingual children was recorded in each assessment task and evaluated with reference to the existing norms for monolingual children who speak English and Greek, as given in each of the published tests manual. As much as data from monolingual children are not reliable for the assessment of bilingual children, monolingual norms are reported as a point of reference for the evaluation of performance on naming accuracy, elicited language production and story retelling narrative skills.

### *Naming accuracy*

Vocabulary production raw scores are presented in comparison to norms of monolingual children of the same age (Table 1). With regard to vocabulary production both children scored above average performance of 7;0- to 7;6-year-old monolingual English-speaking children. In Greek, both children scored well below average performance of monolingual peers. The age equivalent for the scores obtained is 3;11 years for J and 4;5 years for K, respectively.

**Table 1. Naming accuracy with reference to norms of monolinguals of the same age**

English				Greek		
J (7;5)	Monolingual Norms – girls (Renfrew, 1995)	K (7;4)	Monolingual Norms – boys (Renfrew, 1995)	J (7;5)	K (7;4)	Monolingual Norms (Vogindroukas et al., 2009)
40	38.8 (±5.74)	40	38.4 (±5.785)	16	21	33.2 (±7.5)

In order to gain a better understanding of vocabulary production skills, responses to test items were further rated as accurate in both languages, not produced at all/inaccurate in both languages, accurately produced only in English or only in Greek. Results are presented in Figure. 1. The



performance of J can be seen on the left side and the performance of K. on the right. For both children a considerable amount of words is produced successfully, only in English. Nevertheless, accurate production of a small proportion of words only in Greek was also observed.

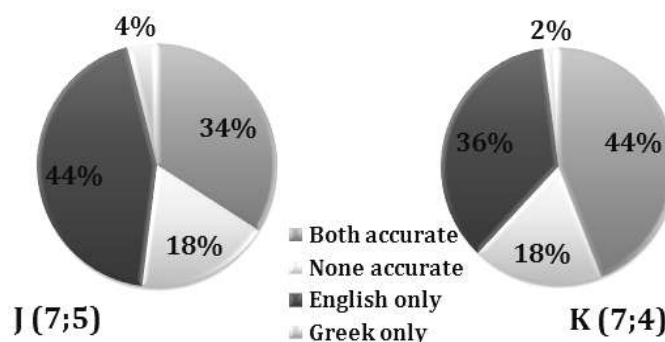


Figure 1. Comparison of performance in naming accuracy between English and Greek

### *Elicited language production*

Elicited language production was scored for the amount of information provided and the grammatical elements accurately produced (Table 2). With regard to the English language information score, both children scored below average performance, J being on the borderline. The English language grammar score was above the group mean for both children. Turning to the Greek language, the children scored above or very close to the mean in both measurements.

Table 2. Elicited language production with reference to norms of monolinguals of the same age

	English			Greek		
	J (7;5)	K (7;4)	Monolingual Norms (Renfrew, 1997a)	J (7;5)	K (7;4)	Monolingual Norms (Vogindroukas et al., 2009)
Information	30	33	35 ( $\pm 3.45$ )	35	41	29.5 ( $\pm 9$ )
Grammar	32	38	29 ( $\pm 3.97$ )	42	38	39.9 ( $\pm 9$ )

### *Story retelling*

Narrative production was scored for the amount of information provided, the Mean Length of Utterance of the five longest sentences (5-MLU) and the number of Subordinate clauses included in the sample (For a better understanding of narrative skill, the narrative data were further investigated for qualitative differences in performance between the two languages. Linguistic disfluencies, such as repetitions, hesitations, revisions were not observed in any sample. Code-switching was occasionally observed since English words were included in Greek narratives (J 2/148 words, K 3/129 words). In addition, data from J's Greek narrative sample demonstrate occasional difficulties with case assignment and morphosyntactic agreement, which is necessary in the Greek language. Finally, J's Greek narrative sample provides no evidence of spontaneous object clitics use.

Table 3). With regard to the information score, both children provided adequate amount of information in their narratives in both languages tested. With regard to the 5-MLU, both children performed within the expected range. It is worth noting that J produced longer utterances in English, whereas K

produced longer utterances in Greek. Greek is a morphologically rich language compared to English; MLU, however, is calculated by dividing the number of words by the number of phrases. The morphological characteristics of each language are applicable to both participants, so we consider that the dissociation observed between the two can provide information on the linguistic profiles observed in bilingual children. Finally, with regard to syntactic subordination, overall performance indicates that complex structures may be an area of relative weakness, as the performance range falls below the average performance of peers. Nevertheless, both children produced more subordinate clauses in Greek.

For a better understanding of narrative skill, the narrative data were further investigated for qualitative differences in performance between the two languages. Linguistic disfluencies, such as repetitions, hesitations, revisions were not observed in any sample. Code-switching was occasionally observed since English words were included in Greek narratives (J 2/148 words, K 3/129 words). In addition, data from J's Greek narrative sample demonstrate occasional difficulties with case assignment and morphosyntactic agreement, which is necessary in the Greek language. Finally, J's Greek narrative sample provides no evidence of spontaneous object clitics use.

**Table 3. Narrative production with reference to norms of monolinguals of the same age**

	English			Greek		
	<b>J (7;5)</b>	<b>K (7;4)</b>	<b>Monolingual Norms (Renfrew, 1997b)</b>	<b>J (7;5)</b>	<b>K (7;4)</b>	<b>Monolingual Norms (Geronikou, 2016)</b>
Information	43	44	32.6 ( $\pm 6.8$ )	29	43	30.38 ( $\pm 7.70$ )
5-MLU	23	16.4	12 (n.a.)	16.2	23	9.67 ( $\pm 1.43$ )
Subordinate clauses	2	0	4 (n.a.)	5	2	4.38 ( $\pm 2.18$ )

### Summary of findings

To sum up, data from the present study indicate that both children had adequate productive vocabulary in English. With regard to elicited language production, participating children seem to have relative proficiency in both English and Greek. With regard to story retelling, both children were able to produce coherent narratives in both languages. Minimal instances of code-switching were observed, limited to the intrusion of individual words of L1 (English) in the L2 (Greek) narrative. Such data may be informative of language production and code-switching mechanisms.

### Discussion

The expressive language skills of two school-aged children of Greek heritage were explored in the present study. Responses on most tasks were within the norms; nevertheless, specific measurements allowed distinguishing differences between the two participants of similar age, as well as differences between the two languages in the same child.

Starting with differences observed between the two participants, calculation of MLU in 5 longer sentences indicates dissociation in performance between the two children. J produced longer utterances in English, whereas K produced longer utterances in Greek. This is not surprising given that narrative assessment tasks in an L1 and L2, which appear to be comparable, may not pose similar processing demands on a bilingual speaker. Typically developing children who are fluent in two languages may not show equivalent levels of narrative proficiency in the L1 and L2 (Gutiérrez-

Clellen, 2002). Moreover, the specific nature of the morphologically richer Greek language could potentially be affecting K's performance. The relationship between MLU and vocabulary size has been found to be non-linear in English but linear in Italian, suggesting the potential role of grammar in a richly inflected language (Devescovi, Caselli, Marchione, Pasqualetti, Reilly, & Bates, 2005). Although both participants share the same languages, their performance is not identical. The present data allow the hypothesis that the effect of potential factors underpinning language acquisition is different for each child.

Turning to differences between English and Greek language performance, assessment of expressive vocabulary revealed that for both children a considerable amount of words were produced successfully, only in English. This indicates a clear dominance of the language of the country of residence and should not be taken as an indication of reduced vocabulary knowledge. It is well established that the total vocabulary size in both languages should be taken into consideration when assessing bilinguals (Thordardottir, Rothenberg, Rivard, & Naves, 2006). On the other hand, one cannot exclude the possibility that the characteristics of the Greek language may relate to the limited expressive vocabulary in Greek. Vocabulary size and vocabulary composition in Greek children aged 1;6 to 2;11 was investigated using a Greek adaptation of Rescorla's (1989) Language Development Survey (LDS). Participants were 273 toddlers coming from monolingual Greek-speaking families. The Greek LDS data were compared with US LDS data obtained from the instrument's normative sample (Achenbach & Rescorla, 2000). Greek toddlers had significantly smaller mean vocabulary score than US toddlers (Papaeliou & Rescorla, 2011). The authors suggested that vocabulary acquisition may accelerate more slowly in Greek than in English, because Greek is morphologically a more complex language. Consequently, Greek children are exposed to more morphological variants of the same word than US children, and as a result they may be slower to form phonological representations of words.

The narrative productions demonstrated lengthy utterances for both children in parallel with extended use of coordinating rather than subordinating conjunctions. The present findings seem to be consistent with other research which found significantly lower subordination index for German/Greek bilinguals compared to Greek monolinguals' narratives (Andreou, Knopp, Bongartz, & Tsimpli, 2015). It should be noted that both participants used more subordinate clauses in Greek. Greek is a pro-drop language, thus the subject may be omitted; Greek also has free-word order and grammatical relations are indicated by verbal affixes. It is possible that characteristics of the language may be affecting performance. Greek is less restrictive in terms of the sentence structure to be used; reduced cognitive load on sentence structure may, in our opinion, facilitate the production of subordinate clauses either at the beginning or at the end of the phrase, wherever it is context appropriate.

Observation of J's narrative production revealed that occasionally she fails to clearly assign gender and/ or case. The acquisition of grammatical gender in Greek appears to involve syntactic agreement from the early stages (Unsworth, Argyri, Cornips, Hulk, Sorace, & Tsimpli, 2014). A possible explanation of J's difficulty with gender and/ or case assignment could be that there is an effect of bilingualism in developmental progression for the acquisition of case marking. Previous research has shown that at the age of four typically developing bilingual German/Italian children demonstrated a delay in dative case marking in German when compared to monolingual peers. By the age of seven, however, bilingual children performed similarly to their monolingual peers (Scheger, 2018).

## **Conclusion**

Taken together the results of the present study suggest that there is a need for normative data of typically developing bilingual children with L2 being the Greek language to allow for early identification of language impairment or delay. By assessing narrative performance in the two languages, it may be possible to uncover individual differences in bilingual acquisition. In order to assess narratives in bilingual children adequately, assessments need to address cross linguistic differences between the L1 and L2.

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## **Micro-linguistic features in Chinese EFL learners' narrative and expository writing**

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**Abstract.** This study evaluated the narrative and expository English writing corpus from 20 Chinese English learners at three linguistic levels: the use of literate words (elaborated noun phrases, conjunctions, adverbs, and mental linguistic verbs), the degree of sentence complexity, and the use of subordinate clauses (nominal, adverbial and relative clauses). Results first revealed a genre effect on literate word use, but not on utterance length and clausal density. Specifically, there were more elaborated noun phrases and conjunctions in expository writing but more adverbs in narrative writing. Results also showed a genre effect on the use of relative clauses but not on other clauses. These results highlight the need for genre-dependent writing instruction to make students aware of the different language resources expected across genres as specific contexts of communication. Pedagogical implications are discussed too.

**Keywords:** narrative, expository, writing, second and foreign language, linguistic features, genre

### **Introduction**

China is currently considered to have the largest number of learners of English as a second or foreign language (L2) in the world (Wen & Gao, 2008). However, the English writing abilities of Chinese learners are still of concern. For example, they may still experience language barriers when they are writing in English in an English-speaking country (Tian & Low, 2012). According to the official website of International English Language Testing System (IELTS, 2013), the mean writing score achieved by 2011 Chinese Academic candidates was 5.2 out of 9, ranking them 8th out of the 40 most frequent countries or regions of origins (see also Mayor, 2006). In order to discern the source of the poor writing performance of Chinese learners of English, researchers have focused on the macro-level features of student writing, such as rhetorical organization and expression of ideas, which may exhibit cross-cultural differences (Cahill, 1999, 2003; Chen, 2008; Ji, 2011; Kirkpatrick, 1997; Matalene, 1985; Miao & Lei, 2008; Mohan & Lo, 1985; Qin & Karabacak, 2010; Wang & Wen, 2002). Only until recently has attention been paid to micro-level features in the L2 writing of Chinese speakers. More importantly, the majority of empirical studies have focused exclusively on a single genre, without regard to the observation that writing involves the choice of stylistic options at lexical and syntactic levels that may be genre-specific (Beers & Nagy, 2009).

We are aware of only two studies that have examined the use of linguistic resources in EFL writing across different genres. Lu (2011) compared a corpus of timed argumentative and narrative essays from Chinese undergraduate students of English as a foreign language (EFL) and found that in 12 out of 14 measures, syntactic complexity was greater in the argumentative essays than narrative essays. Qin and Uccelli (2016), on the other hand, collected 200 English written texts (100 argumentative essays; 100 narratives) from 100 EFL Chinese secondary school learners and scored for quality, lexico-syntactic, and genre-specific discourse features. Qin and Uccelli found that argumentative essays displayed more sophisticated lexico-syntactic features, showing higher frequency of long words, abstract nouns, and words per clause than narrative texts even though texts in the two genres showed no significant differences in quality ratings. As these researchers pointed out, however, several important measures deemed to be critical in advanced academic writing (e.g., complex noun phrases, clausal density, complex syntax) were not explored.

Thus, the current study sets out to compare the linguistic features of the narrative and expository writings of Chinese EFL learners. Specifically, the present study tried to address two research questions, (a) How does the use of literate words differ in narrative versus expository discourse? and (b) How does the use of complex syntax differ in narrative versus expository discourse of Chinese learners of English?

## Method

### *Data*

Data for this study were obtained from a larger corpus of learner English, *Corpus for English Majors* (CEM, 2008). CEM is one of the largest commercial corpora of Chinese Learner English available in the market. CEM consists mainly of English writing compositions and Chinese-to-English translations that Chinese college students majoring in English language and literature produced when they took the national Test of English Majors (see Jin & Fan, 2011 for details of the test which includes two levels — TEM4 and TEM8). The corpus consisted of around one million words at the time of its first publication in 2008, but its size has kept growing as other materials are added on a regular basis. The data that we chose to focus on are the writing compositions.

Narrative writing response to the topic “*an unforgettable day*” and expository writing on the topic “*a satisfactory job*” from 20 second or third year (4 males and 16 females) undergraduate Chinese students of English language and literature were randomly selected for the present study. The age of the participants ranged from 19 to 21 years. The participants would be classified as intermediate-to-advanced learners according to the national syllabus (English Team of Teaching and Learning Guidance Committee for Foreign Language Majors in Higher Institutions, 2000).

### *Data coding and analysis*

Each writing sample was transcribed into a computer database according to the Systematic Analysis of Language Transcripts (SALT, Miller, 2012) conventions. The writing samples were segmented into T-units, which Hunt (1970) defined as a main clause (MC) with any accompanying subordinate or dependent (SC) clauses. For each sample, SALT automatically calculated total T-units (TTUs), mean length of T-unit (MLTU), and total words (TW). Each sample was then coded and analyzed for micro-level linguistic features.

For the production of literate lexicon, we coded the samples for all instances of Elaborated noun phrases (ENP, e.g. *the red apple*), Adverbial phrases (ADV, e.g., *definitely, really*), mental and linguistic verbs (MLV, e.g., *believe, imagine*), and conjunctions (CONJ, e.g., *after, because*). We were interested in how frequent each type of literate words occurred in each writing sample. Controlling the variation in text length (Crossley & McNamara, 2012), we divided the total number of each type of literate lexicon in each writing sample by the TTU, and multiplied the obtained number by 100 to yield the percentage of T-units that contained at least one instance of a particular type of literate word.

For syntactic complexity, the texts were coded for the production of subordination. Following Nippold, Hesketh, Duthie and Mansfield (2005), and Sun and Nippold (2012), finite and infinitive SCs were tagged separately, and for those finite SCs three types were coded: relative clause (RC), adverbial clauses (AVC) and nominal clauses (NOM). This allowed us to first obtain two measures of causal density (CD) for each sample.  $CD_1$  was obtained by summing the number of MCs and SCs (finite or infinitive) in a sample and dividing this summation by the TTUs. By contrast,  $CD_2$  was obtained by consisting of the total number of finite clauses (main clauses + RC + AVC + NOM) divided by the TTU. This also allowed us to obtain a measure of the frequency of occurrence of the three finite subordinate clauses (i.e. NOM, AVC and RC) per T-unit for each writing sample. Again, we divided the total number of each type of finite SCs in each writing sample by the TTU and multiplied the obtained number by 100 to yield the percentage of T-units that contained at least one instance of a particular type of SCs.

For measures not automatically calculated by the Systematic Analysis of Language Transcripts

Software (SALT; Miller, 2012), two researchers independently coded each writing sample and intercoder agreement (point-by-point agreement) ranged from 88% for segmentation of T-units, 96.5% for the coding of clauses, and 97.8% for the coding of subordinate clauses. All disagreements were resolved by discussion between the two researchers.

## Results

Descriptive and inferential statistics comparing the lexical and syntactic features of narrative and expository texts are reported in Table 1.

**Table 1. Descriptive and inferential statistics comparing the lexical and syntactic features of narrative and expository texts**

	<u>Narrative</u>	<u>Expository</u>	<i>F</i>	<i>p</i>	
	M (SD)	M (SD)			
Lexical					
Level					
	ENP	37.56 (21.19)	66.18 (22.24)	17.36	0.000*
	ADV	13.69 (11.42)	6.10 (6.15)	6.84	0.013*
	CONJ	61.13 (23.09)	88.39 (33.43)	9.01	0.005*
	MLCV	51.90 (27.40)	39.54 (19.52)	2.70	0.109
Syntactic					
Level					
	TTU	18.85 (7.88)	19.40 (3.47)	0.08	0.771
	MLTU	13.19 (2.66)	14.65 (1.99)	3.85	0.057
	CD <sub>1</sub>	2.46 (0.60)	2.33 (0.35)	0.67	0.419
	CD <sub>2</sub>	1.85 (0.38)	1.72 (0.29)	1.34	0.254
	AVC	23.98 (13.44)	20.35 (11.97)	0.81	0.373
	NOM	25.72 (15.04)	13.45 (14.57)	0.24	0.631
	RC	7.29 (7.97)	14.47 (10.15)	0.62	0.017*

The results indicated that there was a significant difference between narrative and expository writing samples in each of the four types of literate language features except for MLV. Elaborated noun phrases (ENP) and conjunctions (CONJ) were more frequent in expository texts than in narrative texts. By contrast, narrative texts included more adverbs (ADV) than expository discourse. No significant difference was found between narrative and expository texts in the use of mental and linguistic verbs.

The results also indicated that there was a significant difference between narrative and expository texts for the total number of words (TW). TW was significantly higher in expository texts than in narrative texts. There were no significant differences between narrative and expository texts, however, in total number of T-units, mean length of T-units, or clausal density (CD1 and CD2).

As for the production of the three types of subordinate clauses, namely adverbial clauses (AVC) and nominal clauses (NOM), significant difference was found only in relative clauses (RC) which were more frequent in the expository genre than in the narrative genre.

## Discussion

The first goal of this study was to assess the use of lexical features in the English writing of Chinese students and, in particular, whether the use of literate language features would differ in their narrative

versus expository writing. Results indeed found a genre effect in the production of three of the four types of literate words that we examined: ENPs, CONJs, ADVs. In particular, our participants produced more ADVs in narratives, but more ENPs and CONJs in expository discourse. By contrast, genre does not have a significant impact on the use of mental state verbs. These patterns of different literate word use in L2 writing across genres have been found in L1 writing too. Sun (2008), for example, compared the narrative and expository writing of three groups of American students (5<sup>th</sup> graders, 8<sup>th</sup> graders and 11<sup>th</sup> graders) and found a significant impact of genre on the use of the four types of literate words except metalinguistic verbs. Our results thus suggest that the Chinese learners of English as a foreign language who participated in this study were sensitive to the genre differences in literate language features.

A second goal of this study was to assess whether genre would impact on the use of microlinguistic features at the syntactic level. Results showed that it did not, except for the use of relative clauses (RC) which was found to be more frequent in expository samples than in narrative samples. When controlling the effect of genre, MLTU was positively correlated with measures of clausal density, and these in turn are well correlated with the production of NOMs, RCs and AVCs. In other words, longer utterances may result in more frequent use of clauses as in the following example, which contains all three types of subordinate clauses.

- (1) *If a job maintains all the aspects I have mentioned, I believe that it must be most perfect and satisfactory job for me [AVC][RC][NOM].*

These patterns are similar but also slightly different from what has been found in the writings of native speakers of English. Plourde (2010), for example, compared the syntactic complexity in the expository and narrative writings of 50 ninth graders in the United States using similar measures as the present study. She found significant differences between narrative and expository syntactic complexity, with expository essays exhibiting greater subordination (as measured by number of clauses per sentence) and relative clause use. Plourde (2010) also found syntactic complexity to be related to writing quality in English as a first language. Future research can examine how syntactic complexity may impact the quality of writing in Chinese learners of English and how the relationship between syntactic complexity and writing quality may be dependent on genre and the measures used to quantify syntactic complexity. If written texts in different genres indeed benefit from a writer's use of specific lexical and syntactic forms (cf. Taguchi, Crawford, & Wetzel, 2013), genre-specific writing instruction that includes attention to these lexico-syntactic features may lead to improved outcomes (Beers & Nagy, 2009).

## Conclusion

The present study contributes to EFL writing studies by examining cross-genre differences in several lexico-syntactic measures that were deemed to be critical in advanced academic writing but were not explored in previous literature. In this study, we found that the writing of Chinese learners of English exhibited significant impact of genre on the production of microlinguistic features at the lexical level, and to a lesser degree at the syntactic level as well. Our study highlights the utility of a fine-grained, multidimensional analysis in our understanding of the interaction between genre and micro-level linguistic features in second and foreign language writing. The present study revealed that intermediate-to-advanced Chinese learners of English were, for the most part, sensitive to the different language resources expected for expository and narrative writing. Future research could compare the performance of EFL learners and native speakers in their writing across genres and identify the linguistic features that contribute to the quality of writing to inform the design of pedagogical approaches and classroom practices that seek to promote EFL learners' writing performance across genres.

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## What constitutes a “good artwork presentation”?

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**Abstract.** The purpose of this study is to identify the required linguistic and nonlinguistic elements to give an effective artwork presentation. Most art students have chances to showcase their work with a talk, most commonly, at critique sessions. Although art students need to introduce their works to the public, to other artists and companies, little research has been done on the method of an artwork presentation, in contrast to research on academic and business presentations (Oshima, 2002; Rendel-Short, 2006). In particular, there is almost no structured study or systematic teaching method for artists' presentations in a foreign language in Japan, although Japan is witnessing globalization patterns in many fields including the arts, and an increasing number of foreigners are coming to Japan. To answer the research question, “What constitutes a good Second Language (L2)/Foreign Language (FL) artwork presentation?”, videotaped presentations were qualitatively analyzed by an artist lecturer, a communication specialist, a linguist, and ESL/EFL researchers. The findings show that linguistic fluency is not the most crucial factor in constructing effective presentations; speaking style, visual aids, and nonlinguistic elements play essential roles. The findings also suggest that an artwork presentation is not so distinct from other types of presentations, e.g. an academic presentation, with regard to the importance of coherence. This study also suggests presentation criteria that can be used by educators who teach university art students.

**Keywords:** artwork presentation, speech presentation, L2/FL speech, ESL/EFL teaching, art education

### Introduction

In the age of globalization, the interaction of people, goods, and information between countries has increased; national borders have been disappearing in various areas. Consequently, communication competence is becoming more important than before. Under such circumstances, our ideas need to be presented to people from various backgrounds in a clear and precise manner, not only in one's first language but also in a second (L2) or a foreign language (FL).

Modes of communication are not limited to language alone. For example, messages can be communicated through artworks. However, even in artistic fields, language is frequently used by artists to introduce their artworks. In Japan, many students majoring in arts have chances to showcase their artworks during a talk most commonly at critique sessions, exhibitions, and job interviews.

Among the arts, especially in what is called media arts (videos, animation, comics, interactive art, digital art, and games), works created by Japanese artists have recently been drawing attention abroad. If these artists can introduce their work and deliver artist talks in a lingua franca, like English, they can improve their ability to deliver messages to the world. This study investigates English presentations of artwork by analysing several presentations recorded on video. The authors of this paper investigate how to make effective presentations when such artworks are presented, and they also provide guidance on it. This study aims to identify the characteristics, both linguistic and non-linguistic, of a good artwork presentation to use them as references for teaching art presentation.

### Definition and literature

The terms “presentation” and “speech” are used sometimes interchangeably and sometimes distinctively. This study uses the term “presentation” and defines it as a talk delivered using visual aids such as videos, pictures, or slides.

Previous studies on academic and business presentations can be found in fields such as communication theory, performance studies, and educational engineering. Oshima (2002) points out the educational effects of presentations by applying business presentation methods to an educational setting. Pittenger, Miller, and Mott (2004) used, in their classroom, presentation criteria which are widely accepted in the business world. They conclude that this application successfully developed their students' business presentation skills. Bankowski (2010) examined methods to improve students' academic presentation skills. Although the study of English presentations by English-learners is a relatively new field, there is a study by Zappa-Hollman (2007) on academic presentations delivered by non-native English speakers.

Nevertheless, there are very few previous studies on the presentations of media artworks, especially those of artwork presentations in a foreign language. The only available previous studies of that field are the ones by Kitsuno (2015), and Okubo, Koga, Suyama, and Kitsuno (2016) on attitude surveys and practical reports.

The present study examines the nature of artwork presentations and the required skills to make artwork presentations in an exploratory manner and compares them to those of academic and business presentations. Additionally, this study examines the skills necessary to make presentations in a foreign language, in this study, English. Based on those results, we draw up rubrics for teaching how to prepare artwork presentations.

## **Methodology**

### *The purpose*

The purpose of this study is twofold: (1) to find drawbacks in art students' presentations and consider likely solutions, and (2) to create criteria to instruct and evaluate artwork presentations.

### *Data*

Videos of four art students' English presentations about their artworks were used in this study. They all attend the same art university in Japan. Two of the presentations were given when the students participated in an English language program in Australia. The other two were made when the students joined an English presentation session with students from other universities. The majors of these four students are diverse: manga (comics), imaging art, illustration, and interactive media.

We asked three experts: a professor of art, a professor of communication, and a professor of English linguistics, to watch the videos of the students' presentations and to make comments on the contents and organization of the presentations, their delivery, and the visuals they used.

## **Results**

### *Presentation 1*

Ayumi, the speaker of Presentation 1 (Appendix 1) majors in manga. Her presentation consisted of three parts. She started by introducing herself and her hobbies and explaining the courses she was taking on drawing and character designs. Finally, she showed the audience her own works of four-frame manga.

Experts commented on her presentation saying that she needed to better explain the manga she created. An academic presentation usually has a thesis statement, the central argument of the speaker. In Ayumi's presentation, her artworks should be the main point of the presentation, and her thesis statement should be about the explanation of her works. However, her presentation did not address the vital idea clearly. We speculate that art students do not have ample experience in academic writing or speaking and are not trained to construct a central argument. Training on academic writing might help them to improve their skills on how to organize ideas and information.

Experts also said that her presentation ended quite abruptly; it did not have a conclusion. One of the features of academic presentation is that it should have a conclusion including a restatement of the thesis, a summary of main points, and a comment of future directions, such as suggestions or implications. The main purpose of such a conclusion could be to convince the audience to agree with the speaker, especially when the presentation is a persuasive one. In the case of artwork presentations, however, we speculate speakers might assume that giving information about the work is enough and might not consider it essential or necessary to remind the readers about their message. Whether this is a common assumption among art students needs further research, but it would be helpful if teachers gave students specific instructions about the structure and features of each section.

As for English proficiency, experts say that she needed to improve pronunciation of English to make herself understood more easily and clearly. We expect that improvement of rhythm and pitch will improve her presentation.

There were also some comments about her visuals. This might be common among many art students who use many images in slides such as illustrations, photos, or graphics. Such artistic slides appeal to the audience but might not always be informative. Ayumi was advised to show keywords to make her explanations clearer. Showing keywords might be a good way to improve their presentations, especially when speakers are not fluent in English.

### ***Presentation 2***

The speaker of Presentation 2 (Appendix 2), Madoka, majors in imaging art. Similarly, to the speaker of Presentation 1, Madoka also started by introducing herself. The central topic of Madoka's presentation was the video she created at the university. She showed the video to the audience and explained what it was about and how she created it.

Experts pointed out a problem in Madoka's presentation, that of time limitation. By showing the video (about 1 minute 30 seconds long), she did not have sufficient time left to talk, and an expert said the remaining part of her presentation was brief. The experts' comments might suggest that teachers instruct art students to prioritize the organization of points in their presentations. When speakers engage in presenting some form of imaging art or films, it would be effective to show the video to the audience, but they also need to ensure that they allow ample time to discuss it.

This speaker also received a comment on the visuals. Since Madoka is majoring in imaging art, she made an attractive slide using an infographics movie. However, a communication expert commented that the movie would be more effective if the slide had a title to show what the movie is about. Art students might tend to elaborate visuals artistically, but it does not necessarily mean their visuals are informative enough. They need to be explicitly taught how to make compelling visuals to make their English presentations more clearly understood.

### ***Presentation 3***

The speaker of Presentation 3 (Appendix 3) is Myung Hoon, a Korean student, who majors in illustration. He started his presentation by talking about a famous Japanese artist who influenced him. Then, he explained his methods of painting, namely analogue and digital, and finally, he showed the audience his own works.

This presentation received a positive comment about its organization. Starting with his favourite artist, explaining the methods used, and moving on to some of the artists' recent works ensured a clear flow in the presentation. However, there was a comment suggesting that he ought to elaborate on the relevance between the topics. For example, the speaker said that the famous artist influenced him, but he did not explain how he was influenced. He also discussed the two methods of painting used, analogue and digital, but it would have been more interesting if he had provided a detailed deliberation on the similarities and differences between these two methods.

With regard to delivery, experts thought his English was good and fluent, but interestingly, the expert of communication said it was "too smooth". This applies not only to art presentations but to all kinds of presentations, but a fluent and accurate talk does not necessarily mean a "good" presentation. The

expert pointed out that the speaker needed to better modulate his voice in terms of stressing or pausing.

The expert of communication also said that the illustrations on the slides should have been bigger. We can speculate that Myung Hoon found the right size of illustrations as a designer, but design and comprehensibility do not always correlate with each other.

#### ***Presentation 4***

Yumi is the speaker of Presentation 4 (Appendix 4). Yumi's presentation was unique for several reasons. First, she appeared wearing a mask on her face, which she did not take off, and the audience did not have a chance to see her face during the entire presentation. Another reason for the uniqueness of her presentation is that it began by playing the video she had created. The video was about a superhero made of cardboards, and the mask that she was wearing was that of the hero. The audience watched the video without the speaker introducing herself, which made an impact. Following the video, the speaker gave some background information on the it, and then she talked about the project of the superhero.

The experts' comments were both positive and negative. A positive comment related to the delivery of her speech. The way she talked appeared to show that she was enthusiastic about presenting her artwork to the audience, and it did not seem that she was making the presentation merely because it was an assignment. As a result, it was not surprising to see the audience exhibiting positive reactions, such as laughing or exclaiming.

The experts also said that she could have improved her presentation if she had included less information. After Yumi showed the video, she explained why she started this project with her friend, and how she made it using visual effect techniques. In the last part, she explained the superhero project and showed some goods, such as stickers. One expert said that it was hard to understand the message of her artwork. The way she presented her work was exciting and entertaining, but the information was not very well organized.

#### ***Summary***

All in all, the analysis of these four presentations showed that the features of good artwork presentations are not very different from those of academic or business presentations. Even in artwork presentations, it is significant to have a clear organization layout, such as an Introduction, Body, and Conclusion that follow a logical flow, or generate a vital argument to be delivered in the presentation. We think that these features bring about coherence. Speakers should set a thesis statement or the main argument in the presentation, and then relate this idea to all the other points made. It can be useful to train art students to follow a logical structure and generate ideas in their presentations in order to develop their skills further.

On the other hand, there is an aspect that is unique among artwork presentations. Visuals in artwork presentations also play a crucial role since the artists' first and foremost intention is to show their work. Artists also ought to pay attention to the size of the visuals used, informative aspects of visuals such as including keywords, and the balance between the talk and the extent of the visuals used.

## **Discussion**

Based on comments and points to be improved, as discussed in the previous section, we created the rubrics for teaching methods of artwork presentation. This should be useful to teachers who teach art students how to give presentations in English.

Table 1 is the rubric of contents. Numbers 1, 2, and 3 show the number of points. The larger a point is, the better a criterion is met. Likewise, Tables 2, 3, and 4 are the rubrics of organization, delivery, and ways to use visual aids, respectively.

**Table 1. Rubric of contents**

Criteria			
	1	2	3
Contents	<ul style="list-style-type: none"> <li>- Non thematic presentation of artworks</li> <li>- Imbalanced between movies and their explanation</li> <li>- Not showing their identity as artists</li> </ul>	<ul style="list-style-type: none"> <li>- Adequate thematic presentation of artworks</li> <li>- Balanced between movies and their explanation to some extent</li> <li>- Showing some of their identity as artists</li> </ul>	<ul style="list-style-type: none"> <li>- Clear thematic presentation of artworks</li> <li>- Well balanced between movies and their explanation</li> <li>- Clearly showing their identity as artists</li> </ul>

**Table 2. Rubric of organization**

Criteria			
	1	2	3
Organization	<ul style="list-style-type: none"> <li>-No organized structure</li> <li>-Limited explanation of the relationship between artworks and other points (Not coherent)</li> </ul>	<ul style="list-style-type: none"> <li>-Lack of some part of Introduction, Body or Conclusion</li> <li>-Partial explanation of the relationship between artworks and other points (Partially coherent)</li> </ul>	<ul style="list-style-type: none"> <li>-Has Introduction, Body and Conclusion</li> <li>-Logical explanation of the relationship between artworks and other points (Fully coherent)</li> </ul>

**Table 3. Rubric of delivery**

Criteria			
	1	2	3
Delivery	<ul style="list-style-type: none"> <li>-Problems with pronunciation and voice modulation</li> <li>&lt;L1 influence&gt;</li> <li>-Lack of eye contact, no communication with the audience</li> </ul>	<ul style="list-style-type: none"> <li>-Some problems with pronunciation and voice modulation</li> <li>-Certain amount of eye contact with the audience</li> </ul>	<ul style="list-style-type: none"> <li>-Pronounce each word clearly and make a good voice modulation</li> <li>-Make eye contact with the audience sufficiently</li> </ul>

**Table 4. Rubric of visuals**

Criteria			
	1	2	3
Visuals	<ul style="list-style-type: none"> <li>- Visual aids are not helpful in understanding the message.</li> <li>- There is no explanation of the slides when necessary</li> </ul>	<ul style="list-style-type: none"> <li>- Visual aids help the audience to understand the message to some extent.</li> <li>- The speaker explains the information in the visuals but not sufficiently.</li> </ul>	<ul style="list-style-type: none"> <li>- Visual aids are very informative and helpful for the audience to understand the message.</li> <li>- The speaker explains the information thoroughly in the visuals when necessary.</li> </ul>

## Conclusion

This study revealed that in arts related presentations, general presentation skills (eye contact, linguistic coherence, and thematic presentation structure) were important. As all presentations have the same purpose of delivering a message, basic skills for the delivery of a message are common. Linguistically, what constitutes a good presentation is having a theme and delivering it with coherence. Non-linguistically, it is important to keep eye contact when addressing an audience. Moreover, visuals are also a crucial part of artwork presentation. Presenters need to give notice the informative aspects of visuals. When making a presentation in a foreign language, as in this study English, both proficiency and intelligible pronunciation in that language are essential. It may not be realistic to expect native production in that language, but second language speakers should pay attention to the language's unique rhythm, intonation, and pronunciation.

This research analysed four presentations by students majoring in different fields of art, and it is not our intention to generalize the result to all other art students. Also, our result is mostly based on our interpretations of the evidence available, and many arguments need further research. For example, it is important for educators to know how motivated art students are to make English presentations. How can they be motivated? Should teaching focus on English language skills or on skills to generate arguments? Answers to these questions will benefit the teachers in their classrooms. However, the present research is of significance in that it provides teachers with evidence on what art students may not be very good at, and with suggestions on how to help students in their classrooms.

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## Appendix 1

Presentation 1: Ayumi

0:06



Hello everyone. My name is Ayumi. I am majoring in Manga at the university. I like Disney and Marvel. I like to draw illustrations and make doll's clothes. This is a Japanese traditional costume, a kimono. It was difficult to choose the color. Not only drawing manga, but I also draw illustrations and design characters. So, I would like to introduce to you what I am doing at the university.

1:01

Let me begin with my works other than manga.

I learned the basics of drawing people and animals. It was a very good class as I didn't have any experience with drawing.

1:22

At the illustration class, we drew illustrations along the topics such as "Funny Zoo", "Humans and Animals", and "Landscapes". I used pencils and watercolors for all my work. After the character design class, I learned to make a character based on motif. The most interesting motif was "Japan". I make a character by putting some Japanese things in a Japanese dog, Shiba. Other designs, a mouse with a tissue, a notebook design, bear and bee.

2:17

Secondly, I would like to introduce my manga to you. I mainly draw four panel manga like right now. My characters have human bodies and non-human heads. For example, the head could be a TV, a smartphone, a cat or a dog. With these characters, I drew manga works in which a TV headed character works for a company. The title is Mechanical Workers. Episode title is "Brand New TV" and "Old Time Wisdom". And a pencil headed and an eraser headed fall in love with a girl. The title is Broken Heart. The episode title is "A Pencil and an Eraser" and "An Eraser".

3:22

I also made stories based on culture and my friends. Although people may think my manga characters are strange or grotesque, I do like them very much. I am in the third year of college now. I will have to make a graduation artwork soon. I would like to draw a manga of my own style as a final achievement of my study.

Thank you for your attention.

## Appendix 2

Presentation 2: Madoka

0:01

I am in the faculty of art at TPU. Today, I would like to tell you about what I am doing at the university. My hobby is walking my dog. Her name is Nami. She is a friendly dog. She likes to run. I think her hobby is playing with a stuffed animal she picked up. I am majoring in imaging art and I am essentially interested in making TV programs. Until two months ago, I was making a TV program at a production team in class. There are pictures at that time. The program was made up of five different segments. Each team consisted of three to four people. The topic of our segment was "concern about overseas students in Japan". This is a part of the video that our team was in charge in the program. Let me show you.

(Showing the video)

2:45

Thank you for watching. Actually, the completed image is only 3 minutes long, but making it took us a lot of time and effort. The aim of this segment was to get Japanese students interested in overseas students. In particular, we put effort into editing work because adding captions and sounds helps viewers to understand our message clearly.

If we make a mistake, it might mislead a lot of viewers. We worked trials and errors to produce high quality videos. If we want start making modifications, the advantage of making videos is that the

more we modify the more our work improves. When a lot of people watch our videos, this makes me happier than anything.

3:58

And finally, I think the most important things of making videos is teamwork and that no one gets hurt including viewers. I want to become a person who can present things from various viewpoints when making TV programs.

Thank you for watching.

### **Appendix 3**

#### Presentation 3: Myung Hoon

Good afternoon ladies and gentlemen. Thank you all for coming. I am Myung Hoon Lee. I am studying illustration at Tokyo Polytechnic University. Today, I am going to introduce the artists that influenced my works. First, I will talk about the artist I was most influenced by. Then, I will tell you about the material I am using and finally about my work.

0:57

My favorite artist is Mizumaru Anzai, a Japanese illustrator. I was influenced by him. His paintings are simple children drawings and sketches. Although simple, his art actually presents the essence of things and uses unsophisticated colors. These paintings have a charm that makes people comfortable. I was influenced by his simplicity and use of color.

Next, I will talk about the material I use? I am using both analogue and digital materials. Among analogue materials, I mainly use acrylic paint and gouache. When you paint over the brush, this leaves a trace which can produce various expressions.

Recently, however, I have also used iPad Pro, a digital material. The advantage of digital materials is that you can draw pictures directly from anywhere and use a variety of colors. I cannot say which method is preferable, but I have the advantage of using both and I do.

2:37

Finally, I will introduce my work. First, my sketches and drawings. I am introducing them because I get ideas while doing doodles. The second topic is 'age'. I have drawn old people who recall their past. I wanted to express 'growing old' with old people memories of their youth using iPad. The last example of my work is an analogue one. Its topic is Tokyo. I have been in Tokyo for more than a year and I used acrylic paint and gouache to describe Tokyo with analogue sensitivity. I thought that acrylic and gouache were suitable for expressing analogue sensitivity.

3:37

So, in conclusion, I have been drawing a picture aiming at simplicity to make people feel comfortable. I hope that many people will see my paintings. Thanks for listening today. I will be happy to answer any questions.

Thank you.

### **Appendix 4**

#### Presentation 4: Yumi

0:00

(Showing the video)

1:10

Good afternoon ladies and gentlemen. My name is Yumi Hayashi, from the Interactive Media Department. I think everybody has watched my movie first. Today, I want to talk about my creative activities.

1:35

The movie you saw was based on my friend, Watanabe's Original Hero. The hero's name is "Housousenshi DAN-BOT". Why is his name "DAN-BOT"? Because his costume was made of cardboard. So "Danbo-ru" and "Robot", DAN-BOT. He is the main character of this story. I redesigned the costume and made a new one in white color. Also, I made an enemy in black color, looking very plain. The two are hostile to each other but, to tell the truth, they are brothers. And they attack by flute and guitar.

2:33

He is Watanabe. My friend, Watanabe, really likes heroes and wants to be one. When I watched his movie for the first time, I was very moved by his passion for heroism. I wanted to make a movie depicting him, because he is an original hero.

3:09

Next, let me explain about how I made this movie. I used the green back screen to create the background. I used effects to turn off the green and add buildings, the ground, grass and clouds, to make the sky and, finally, adjust the colors.

4:15

Finally, let me introduce my other activities relating to this work. This year, I presented this work in several places, like for example the OCF Speech Festival. I wanted more people to remember my work, so I started the DAN-BOT Project and made original products like postcards, can batches, magnets and keyrings. I gave them (0:05:00) to my friends and other people. Moreover, this work will be shown in January at a small exhibition at the university. I am preparing the display and a short animation for this exhibition. There are a lot of things I have to do, but it is a lot of fun. I hope to be able to make more things based on this idea. I am planning to promote this "Housousenshi DAN-BOT" next year also. I will certainly do my best.

6:05

Oh, I almost forgot, I made new stickers for this festival. You are welcome to take one; they will be available at the party. Thank you.

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## **Applying the Native Language Magnet Theory to an L2 setting: Insights into the Cypriot Greek adult perception of L2 English**

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**Abstract.** The Native Language Magnet (NLM; Kuhl, 1991) constitutes a model of early speech perception that could apply to second language acquisition. The model suggests that linguistic experience of a first language may interfere with the phonetic learning of an additional language (Flege, 1995; Iverson et al., 2003; Zhang et al., 2005). Applying this model to the Cypriot Greek (CGR) context implies that the language users will encounter several difficulties with the phonological system of second language English. For the purpose of this study, 130 students between the ages of 17-28 attending tertiary level education had to undertake two auditory perceptual tasks. The first task involved phoneme identification (in line with Baker, 2006) in which students had to listen to a minimal set consisting of five words differing in only one sound and select the word they could hear twice. The second task was a word identification task administered as a two-alternative forced-choice task with a circling response mode (in line with Kkese, 2016). Students listened to a target word and its foil and responded by circling the word they had heard. These kinds of tasks, focusing on both consonants and vowels, were used to eliminate any semantic information from the context. Overall, the results indicated that the participants performed slightly better when dealing with vowels compared to consonants. The most difficult consonants for perception appeared to be plosive and fricative consonants. In terms of vowels, the participants had problems with the perception of vowel length. Age, gender of the participants, second language English proficiency, years of second language instruction, and use are statistically significant factors for speech perception. The findings are in line with the Native Language Magnet model suggesting that speech perception of first and second language contrasts may be negatively correlated.

**Keywords:** Native Language Magnet theory, second language acquisition, speech perception, consonants, vowels

### **Introduction**

Several speech learning models have been proposed to explain L2 (second language) perception by adhering to the relationship between L2 phones and L1 (first language) categories. The most influential models are the Perceptual Assimilation Model (PAM; Best, 1995) and the Perceptual Assimilation Model of Second Language Speech Learning (PAM-L2; Best & Tyler, 2007), the Speech Learning Model (SLM; Flege, 2005; 1995), and the Native Language Magnet (NLM; Kuhl, 1991), even though several other models have also been proposed. PAM and PAM-L2, SLM, and NLM are briefly outlined for the purpose of this study to be more comprehensible.

Best's Perceptual Assimilation Model (PAM) and its extension to L2 learning, the Perceptual Assimilation Model of Second Language Speech Learning (PAM-L2), suggest that nonnative phones are perceived based on their similarity to and discrepancy from the L1 phone that resembles them in the L1 phonological space. Six assimilation types for nonnative contrasts to L1 categories have been suggested involving the Two-Category (TC) assimilation, the Category-Goodness (CG) difference, the Single-Category (SC) assimilation, the Uncategorised-Categorised (UC) assimilation, the Uncategorised-Uncategorised (UU) assimilation, and the Non-Assimilated (NA) assimilation. With reference to the TC assimilation, the two nonnative phones are assimilated to different L1 categories. Nonetheless, the CG difference implies that the two nonnative phones are assimilated to the same L1 category even though the one L2 phone is a better exemplar of the L1 category. For the SC assimilation, the two nonnative phones are assimilated to the same L1 category, but these are equally good or bad exemplars of the L1 category. The UC assimilation involves assimilating the one

nonnative phone to an L1 category, however, the other nonnative phone is perceived as uncategorised. For the UU assimilation, both phones are uncategorised, while for the NA assimilation, the two nonnative phones are very different from the articulatory properties of L1 phonemes and are not perceived as speech sounds.

Whereas PAM and PAM-L2 focus on the discriminatory perceptual abilities between L2 contrasts, Flege's Speech Learning Model (SLM; Flege, 2005, 1995) examines the success of L2 learning as determined by the perceived phonetic similarities between the L1 and L2 phones. The model has a particular emphasis on production of relatively experienced learners. It suggests that nonnative phones are "equivalence-classified" relative to L1 phonemes due to phonetic similarity. If there is great perceived dissimilarity of an L2 phone from the closest L1 phone, a new category is more likely to be formed for the L2 phone. On the contrary, it is less likely for a new category for an L2 phone to be formed through childhood as representations for neighbouring L1 phones develop. In the cases in which a category is not formed for an L2 phone because the former is too similar to the L1 phone, the L1 and L2 categories will assimilate resulting in a "merged" L1-L2.

The third model that tries to account for perceptual confusions is the Native Language Magnet (NLM; Iverson & Kuhl, 1996; Kuhl, 1991) and the Native Language Magnet theory expanded (NLM-e, Kuhl, Conboy, Coffey-Corina, Padden, Rivera-Gaxiola, & Nelson, 2008). NLM adheres to the notion of prototypes for explaining confusions in the discrimination of new L2 phones. Prototypes act as magnets in L2 acquisition with reference to other sounds resulting in perceptual difficulties in the cases in which the L2 phones resemble a prototype. Therefore, nonnative contrasts may be difficult to discriminate when the prototype of an L1 category closely resembles the two L2 phones (Kuhl, 1991). NLM-e operates on five principles referring to (1) "Distributional patterns and infant-directed speech are agents of change," (2) "Language exposure produces neural commitment that affects future learning," (3) "Social interaction influences early language learning at the phonetic level," (4) "The perception-production link is forged developmentally" and (5) "Early speech perception predicts language growth" (Kuhl et al., 2008:982-985).

Therefore, this study aims at exploring L2 perception of English consonants and vowels by CGR (Cypriot-Greek) listeners. The findings are then interpreted in terms of the NLM to explore the validity of the model and compare it with the PAM and SLM. The hypothesis is that the NLM will account satisfactorily for the identifications by listeners with an L1 CGR linguistic background suggesting that several difficulties with the phonological system of L2 English will be encountered since L1 linguistic experience interferes with the phonetic learning of an additional language (Flege, 1995; Iverson et al., 2003; Zhang, Kuhl, Imada, Kotani, & Tohkura, 2005).

## **Method**

### ***Research questions***

The study attempts to answer the following questions:

1. What are the difficulties CGR listeners of L2 English encounter with reference to the phonological system of the target language? Specifically:
  - a. What are the difficulties concerning consonants in L2 English?
  - b. What are the difficulties concerning vowels in L2 English?
2. Are the results in line with the NLM theory?

The research approach used for the first part of the study is quantitative aiming at identifying the difficult phones in L2 English with reference to both consonants and vowels. Differences are examined in the dependent variable (percentage of correctness) thought to be caused by the independent variables (different categories). A qualitative approach, though, is also used for the second part of the study in which the results are examined in terms of the NLM model.

### ***Materials***

### *Phoneme identification task*

For the first developed task, 100 target items in English were arranged in 20 minimal sets consisting of 5 items each. The emphasis was on consonants and vowels of L2 English that are problematic for CGR users (based on teaching experience). Ten minimal sets were included for consonants and vowels respectively. With reference to consonants, these involved /θ, ð, t, d, h, s, z, ʃ, ʒ, dʒ, v, w, f, j, k, g, p, b, n, m, ŋ, l, r/. Vowels included /ɪ, i:, e, æ, a:, ɒ, ɔ:, u:, ʊ, ɜ:, ʌ/. The minimal sets consisted of monosyllabic words that could be contrasted word-initially (i.e. *thigh, thy, die, tie, high*), -medially (i.e. *cooed, could, curd, cod, cord*), and -finally (i.e. *pan, Pam, pang, pal, par-* (for 'paragraph')). Both high- and low-frequency words were included, while the words used had a transparent spelling, even though English spelling is not often isomorphic to pronunciation. The task was in line with Baker (2006), while responses were scored as correct or incorrect generating an overall percent correct score. Similarly, percent correct scores for each consonant and vowel category were also obtained.

### *Minimal pair task*

Two minimal pair tasks were developed focusing on L2 English consonants and vowels. For each minimal pair, a total of 120 target items were compiled arranged in minimal pairs. Each pair was parallel in distribution and semantically contrastive differing in only one sound. This sound could be found word-initially (i.e. *palate - ballot* ['pælət] - ['bælət] for consonants, *itch - each* [ɪtʃ] - [i:tʃ] for vowels), -medially (i.e. *gypping - jibbing* [dʒɪpɪŋ] - [dʒɪbɪŋ] for consonants, *steeple - stipple* ['sti:pəl] - ['stɪpəl] for vowels) or -finally (i.e. *rope - robe* [rəʊp] - [rəʊb] for consonants, *bailee - bailey* ['beɪli:] - ['beɪli] for vowels). With reference to the consonants used, these involved /ð/-/d/, /s/-/z/, /θ/-/ð/, /p/-/f/, /t/-/d/, /m/-/n/, /θ/-/s/, /p/-/b/, /k/-/g/, and /l/-/r/. Vowels included /ɪ/-/i:/, /e/-/i:/, /æ/-/e/, /ɒ/-/ɔ:/, /u/-/ʊ/, /ɑ:/-/æ/, /ə/-/ɑ:/, /ɜ:/-/e/, /ɔ:/-/ɜ:/, and /ʌ/-/ɜ://. Distractors were also intermixed and made up eight of the minimal pairs. Specifically, two to four distractors were used for every 16 presentations. Vowels served as the distractors for the minimal pair task focusing on consonants (i.e. *earned - end* [ɜ:nd] - [end], *cobble - corbel* ['kɒbəl] - ['kɔ:bəl]) while for the minimal pair task focusing on vowels, the distractors were consonants (i.e. *muscle - muzzle* ['mʌsəl] - ['mʌzəl], *molasses - morasses* [mə'læsɪz] - [mə'ræsɪz]). The words were presented in two fully randomised blocks in order to exclude any systematic patterning while high- and low-frequency words were used, which had a transparent spelling. Overall, the words used could have from one to up to five syllables to investigate the syllable factor (unlike in the first task). The task was in line with Kkese (2016).

### *Participants and procedure*

One hundred thirty CGR speakers of L2 English with typical speech and hearing were recruited for the purpose of this study. All the participants were male and female active undergraduate university students between the ages of 17-28 with a minimum IELTS score of 5.0. Before the participants were asked to undertake the developed tasks, they had to fill in a brief background questionnaire in order to ensure that they shared the same characteristics. These referred to L1, educational level, and socio-economic status, since the aim was to eliminate inter-group differences. Participation in the task was on a completely voluntary basis, and students were assured about the confidentiality of their personal information. The only cases in which participants were excluded from the sample involved students whose L1 was not CGR.

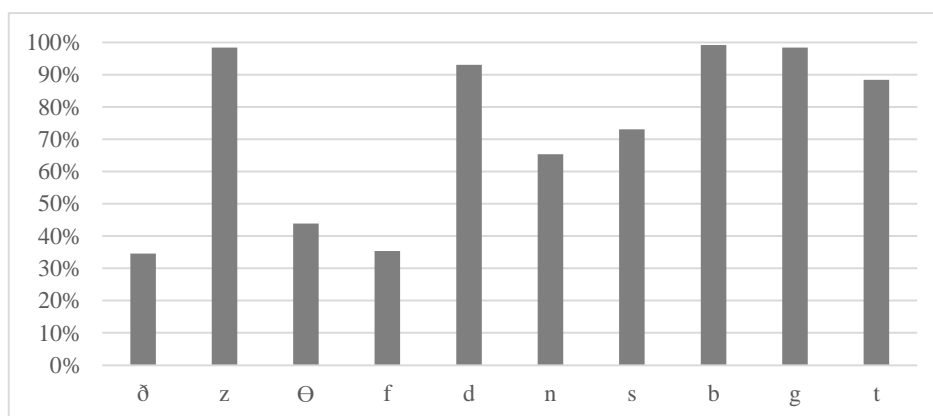
The research period involved one fall semester with data being collected in three different sessions. During the first session, the phoneme identification task was administered and collected, followed by the minimal pair task focusing on consonants, while the third session involved the administration and collection of the minimal pair task focusing on vowels. All tasks were pre-recorded using Audacity 1.3. Beta software for recording and editing sounds. The speaker (one woman, age 35) was a native speaker of English RP (Received Pronunciation). With reference to the phoneme identification task, participants listened to a target word along its four foils and responded by circling the word they heard for the second time. After the phoneme identification task, the two minimal pair tasks were administered as two-alternative forced-choice tasks via a circling response mode. In each task, participants had the minimal pairs in front of them in printed form, while on each trial they listened to

the target word and responded by circling the word they heard. Participants had to listen to the three tasks for a second time, which allowed them to complete any missing information.

## Results

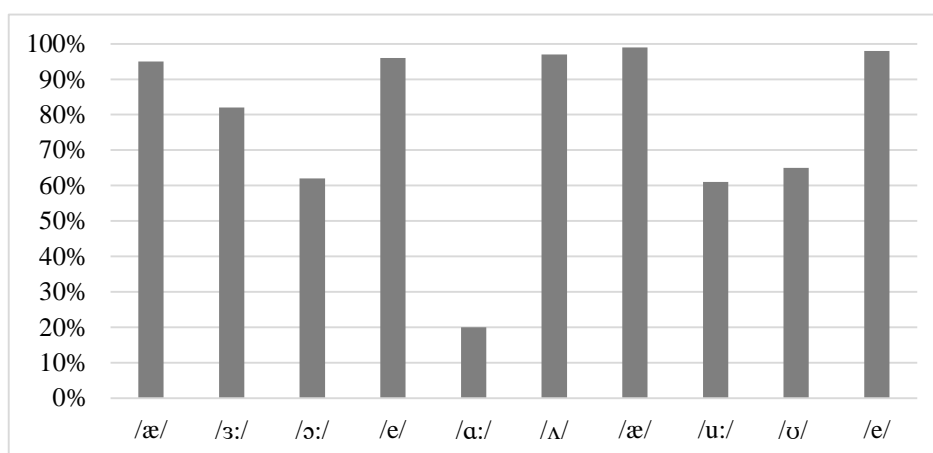
### *Phoneme identification task*

The analysis of the data showed that L2 learners of English had more target perception (75.3%) than non-target perception (24.7%) for both vowels and consonants. According to paired samples t-test, there is a statistically significant difference between target and non-target perception ( $t(129)=29.649$ ,  $p=.001$ ). The students were better at vowel perception (77.6%) than at consonant perception (73%), with the difference being statistically significant ( $t(129)= -3.293$ ,  $p=.001$ ). The participants showed a ceiling effect for such consonants as /z/, /b/, /g/, while the most difficult consonants for perception were /ð/, /θ/, /f/ (see Figure 1). It was revealed that /ð/ was mainly substituted by /d/ (42%) or by /θ/ (42%), and to a lesser extent by /t/ (18%); /θ/ was mainly substituted by /ð/ (97%), whereas /f/ was mainly substituted by /v/ (90%).



**Figure 1. Consonant perception in the phoneme identification task**

Overall, the participants had difficulties with such vowel sounds as /ɑ:/, /ɔ:/, /u:/ and /ʊ/. They showed a ceiling effect for such vowels as /æ/, /e/, /ʌ/ (see Figure 2). It was found that /ɑ:/ was mainly substituted by /æ/ (91%), /ɔ:/ was mainly replaced with /ɒ/ (94%), /u:/ was alternated by /ʊ/ (98%), /ʊ/ was mainly substituted by /u:/ (78%) or to a lesser extent by /ɜ:/ (16%).

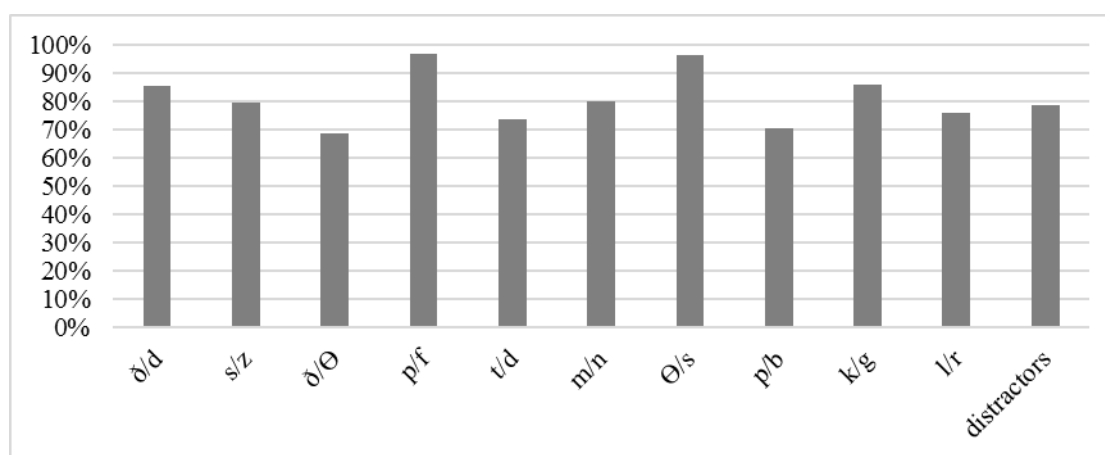


**Figure 2. Vowel perception in the phoneme identification task**

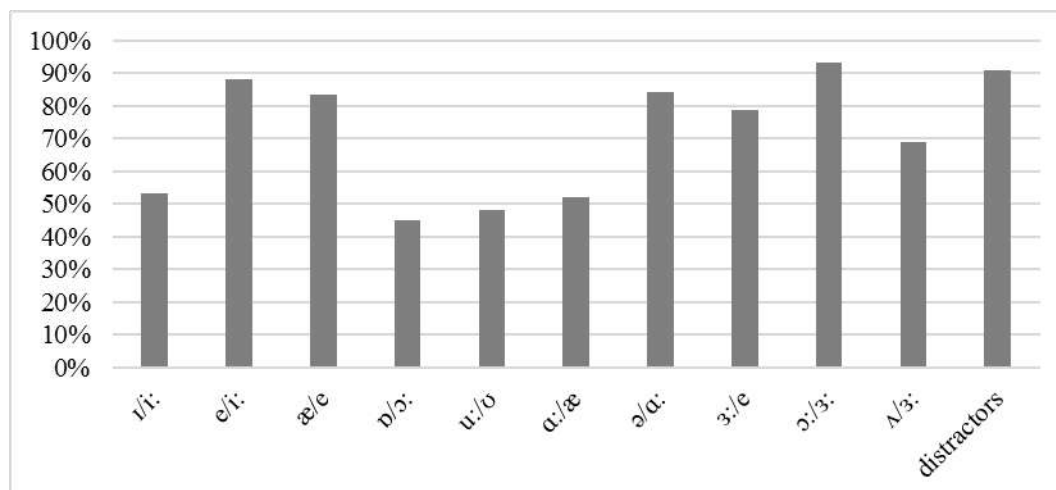
According to the Pearson correlation, age is correlated with total correct perception, both vowels and consonants ( $r(130)=.198, p=.023$ ), total incorrect perception, both vowels and consonants ( $r(130)= -.202, p=.021$ ), total correct vowel perception ( $r(130)=.215, p=.014$ ) and total incorrect vowel perception ( $r(130)= -.213, p=.015$ ). Age was examined as a variable given the range of the participants' age. Years of learning L2 English are correlated with total correct perception, both vowels and consonants ( $r(130)=.270, p=.002$ ), total incorrect perception, both vowels and consonants ( $r(130)= -.185, p=.034$ ), total correct consonant perception ( $r(130)=.231, p=.008$ ) and incorrect vowel perception ( $r(130)= -.231, p=.008$ ).

### **Minimal pair task**

Overall, the results of the minimal pair task seem to be in line with the results of the phoneme identification task. Specifically, the data analysis showed that L2 learners had more target consonant perception (80.28%) than non-target consonant perception (19.72%). The most difficult sounds for perception were /ð, θ/, /t, d/ and /p, b/ (see Figure 3).



**Figure 3. Consonant perception in the minimal pair task**



**Figure 4. Vowel perception in the minimal pair task**

According to the Pearson correlation, age is a statistically significant factor for consonant perception ( $r(130)=.421^{**}, p=.000$ ), as well as gender ( $r(130)=.193^{*}, p=.038$ ), years of studying L2 ( $r(130)=.499^{**}, p=.000$ ), visits to English-speaking countries ( $r(130)=-.299^{**}, p=.001$ ), contact with English people ( $r(130)=-.350^{**}, p=.000$ ), word length, and syllable number ( $r(60)=-.420^{**}, p=.001$ ).

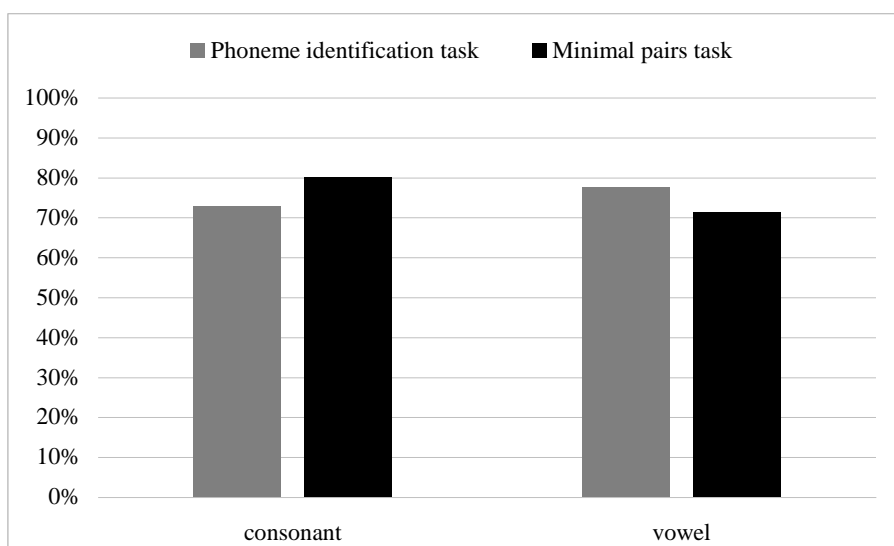


With regard to vowels, L2 learners had more target perception (71.34%) than non-target perception (28.66%), with the difference being statistically significant ( $p=.000^{**}$ ). The most difficult sounds for perception were /ɪ, i:/, /ɒ, ɔ:/, /u:, ʊ/, /ɑ:, æ/ (see Figure 4).

According to the Pearson correlation, age ( $r(130)=.293^{**}$ ,  $p=.001$ ), contact with English-speaking people ( $r(130)=.186^*$ ,  $p=.039$ ), word length, and number of syllables ( $r(60)=-.306^*$ ,  $p=.017$ ) are statistically significant factors for vowel perception. L2 learners had more target perception of consonants (80.28%) than of vowels (71.34%) The difference is statistically significant ( $t(129)= -12.366$ ,  $p=.000$ ).

### **Phoneme identification task vs. minimal pair task**

Overall, the results of the phoneme identification task are in line with the minimal pair task. In both tasks, L2 learners of English had more target perception than non-target for both vowels and consonants. They had slightly higher scores on target perception in the minimal pair task (80.28%) in comparison to the phoneme identification task (75.3%). It seems that there is a task effect; better consonant perception was revealed in the minimal pair task (80.28%) than in the phoneme identification task (73%), the difference being statistically significant ( $t(129)= 119.604$ ,  $p=.000^{**}$ ). As for vowel perception, the participants were better in the phoneme identification task (77.6%) than in the minimal pair task (71.3%). The difference is statistically significant ( $t(129)= 104.035$ ,  $p=.000^{**}$ ) (see Figure 5).



**Figure 5. Vowels vs. consonants perception**

## **Discussion and conclusion**

Overall, participants performed slightly better when dealing with vowels (phoneme identification task) compared to consonants (minimal pair task), which could be due to task effect. Long vowels were replaced by their short counterparts, hence, the long low back unrounded /ɑ:/ was substituted by the short low front unrounded /æ/; the long low-mid back rounded /ɔ:/ by the short mid back rounded /ɒ/; the long high back rounded /u:/ by the short high back rounded /ʊ/. Only, the short high back rounded /ʊ/ was substituted by the long high back rounded /u:/. Concerning consonants, most of the changes involved voicing followed by place of articulation. Specifically, there was a preference for substituting voiced and voiceless consonants with voiced sounds while, with reference to place of articulation, most changes involved dental and alveolar consonants. Therefore, the voiced dental fricative /ð/ seemed to be replaced by its voiceless counterpart [θ] and/or by the voiced alveolar plosive [d]; the voiceless dental fricative /θ/ by its voiced counterpart [ð]; the voiceless labiodental fricative /f/ by its voiced counterpart [v]; the voiced alveolar nasal /n/ by the voiced bilabial nasal [m],

and the voiceless alveolar fricative /s/ by its voiced counterpart [z]. Age, gender of participants, years of L2 instruction and years of experience with English are statistically significant factors for speech perception.

The examined phonetic models posit that native speech experience affects adults' discrimination of non-native speech contrasts. Nonetheless, the models differ in how they perceive the native perceptual framework. Their main difference is whether perceptual mechanisms operate on acoustic or articulatory information. PAM draws upon articulatory phonology emphasising the importance of articulators, constriction locations (place of articulation), and/or constriction degree (manner of articulation) (Best, 1995). SLM emphasises phonetic similarity but does not focus on individual phonemes. Based on NLM, listeners are not successful developing prototypes for non-native categories because of lack of relevant acoustic cues, emphasising the need for social interaction and training to develop L2 phonetic categories.

The participants' difficulties with plosive and fricative consonants involved voicing, while difficulties with vowels referred to vowel length. Overall, L2 adults encountered difficulties, which could be attributed to VOT differences reflecting the language-specific VOT settings of the CGR. Voice Onset Time (VOT) of CGR and English seemed to collapse resulting in having the same category for voiceless and voiced plosives, while for fricatives, their spectral properties and their coarticulatory effects on the following vowel affected their perception. The same pattern was observed for short and long vowels resulting in having the same category. The results draw upon the importance of acoustic cues, such as consonant and vowel duration. SLM remains neutral concerning the mechanisms operating on acoustic or articulatory information, while based on PAM, the non-native phones should have been assimilated to the most similar L1 phonemes due to articulatory gestures and not to a different phoneme. Interpreting the results in terms of NLM could account for the findings of the two perception tasks, since the model suggests that the basis for perception is acoustic features. Perception is based on general auditory properties with the emphasis on the language specificity of speech perception which depends on general perceptual ability to categorise and is elaborated by L1 experience. Consequently, Kuhl's model (NLM; Kuhl, 1991; Iverson & Kuhl, 1996; Kuhl et al., 2008) is suggestive in this regard.

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## Bidirectional grammatical stress in a free lexical stress system

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**Abstract.** There has been a continuous discussion in phonological literature whether word stress should be modelled in terms of metrical grids or metrical feet. This paper contributes to this debate by discussing new data from Ukrainian, which has a hybrid metrical system with unpredictable lexical stress and grammatical secondary stress. The Ukrainian data, which as yet has not been discussed in the generative literature, come from standard descriptive sources (e.g. Nakonečnyj, 1969) and from two recent acoustic studies (Łukaszewicz & Mołczanow, 2018a,b). In accordance with these sources, Ukrainian has both the rightward and the leftward rhythmic stress iteration pattern, depending on the distance between lexical stress and the left/right edge of the word. Secondary stresses alternate in words which are long enough to accommodate them; lapses are tolerated, clashes are avoided. Secondary stress assignment does not depend on the morphological structure of words and is not subject to derived environment effects, e.g. *ˌvelosy'ped* 'bicycle' (N.), *ˌvelosy'pednyj* (adj. masc.), *ˌvelo,sype'dyst* 'cyclist'. The overarching generalisation is that alternating rhythmic stresses in Ukrainian radiate from the edges of the word towards the syllable carrying lexical stress, and not towards the opposite end which is typical of bidirectional, not unidirectional stress systems. We argue that the Ukrainian metrical system poses a challenge for current theories relying on foot structure and/or employing the mechanism of gradient alignment, and provides support for the licensing theories that appeal directly to the metrical grid.

**Keywords:** rhythmic stress, metrical theory, Ukrainian

### Introduction

Beginning with the seminal work of Liberman and Prince (1977), generative metrical phonology has assumed grid-based representations of stress, with grids reflecting relative syllabic prominence. Rather than referring to grids alone, most models of metrical structure have also assumed metrical footing (e.g. Hayes, 1995; Liberman & Prince, 1977), grouping syllables into a hierarchy of headed binary constituents, and aligning the heads of feet with prominence marks on the grid. Research on metrical phonology has amassed a considerable body of evidence for foot structure; nevertheless, it has also been pointed out that feet are irrelevant from the point of view of stress distribution alone (for discussion, see Hermans, 2011). The role of the intermediary foot constituent has been called into question in some work on typologies of stress patterns (Gordon, 2002).

In this paper, we demonstrate that the Ukrainian data, which as yet has not been discussed in the generative literature, favours theories that appeal directly to the metrical grid over those relying on foot structure. According to traditional descriptions (Nakonečnyj, 1969) as well as recent empirical work (Łukaszewicz & Mołczanow, 2018a,b), Ukrainian has weight-insensitive lexical stress, which can appear on any syllable in the word, e.g. *'naholos* 'word stress', *ro'bota* 'work', *kraso'ta* 'beauty'. Secondary stresses are assigned at the word's edges, as well as on every other syllable, forming a predictable alternating pattern. This is illustrated by the examples in (1).

- (1) a. Lexical stress on the final/penultimate syllables, secondary stress on odd-numbered syllables counting from the left edge

ˌσ σ σ 'σ	<i>ˌkapita'list</i> 'capitalist'
ˌσ σ ˌσ σ 'σ σ	<i>ˌkapi,tali'styčnyj</i> 'capitalist, adj.'
ˌσ σ ˌσ σ σ 'σ σ	<i>ˌkapi,talizu'vaty</i> 'capitalise'

- b. Lexical stress on the initial syllable, secondary stress on odd-numbered syllables counting from the right edge

'σ σ σ ,σ	'bačyty, me 'see, 3 <sup>rd</sup> p. sg. future'
'σ σ ,σ σ ,σ	'sonjaš, nyko, vyj 'sun flower, adj.'
'σ σ σ ,σ σ ,σ	'bačyty, mete, sja 'you will see each other'

In the light of the data above, Ukrainian represents a complex bidirectional stress system with internal lapses, with secondary stresses iterating from the edges of the word toward the syllable carrying lexical stress. In bidirectional stress systems reported in the literature, primary stress is typically assigned at (or near) one edge of the word, and secondary stresses iterate from the opposite end towards the syllable carrying primary stress (e.g. Gordon, 2002; Hermans, 2011; Hyde, 2002; Kager 2001, 2005). Classic examples of such systems are Piro (spoken in Peru; Matteson, 1965) and Polish (Łukaszewicz, 2018; Rubach & Booij, 1985), exhibiting a rightward iteration of secondary stresses, and Garawa (spoken in Australia, Furby, 1974), which has a leftward stress iteration pattern. Characteristically, odd-parity words in these languages have lapses (i.e. sequences of unstressed syllables) adjacent to the peak: ,σ σ ,σ σ σ 'σ σ (Piro) vs. 'σ σ σ ,σ σ ,σ σ (Garawa).

Unlike bidirectional stress systems described previously in the literature, Ukrainian exhibits both the rightward and leftward iteration of secondary stress, depending on the location of the lexical stress and the number of syllables separating it from the edges of the word. Most problematic for analysis are the two co-existing secondary stress patterns juxtaposed in (2).

- (2) a. rightward iteration: ,σ σ ,σ σ σ 'σ                    ,muni, cypali 'tet 'municipality'  
 b. leftward iteration: 'σ σ σ ,σ σ ,σ                    'lahody, tyme, te 'repair, 2<sup>nd</sup> p. pl.'

The overarching generalisation is that secondary stresses in Ukrainian are “repelled” from the syllable carrying primary stress towards the word’s edges. We argue in the remainder of this paper that theories based on foot-sized constituents or gradient alignment can account for either the rightward or the leftward iteration pattern, but are unable to accommodate both patterns at a time.

## Theoretical implications

Although practically all contemporary metrical theories provide tools for describing bidirectional stress systems with internal lapses – rooted in grid-based, foot-based, or parameter-based mechanisms (e.g. Alber, 2005; Gordon, 2002; Hyde, 2002; Kager, 2001, 2005; McCarthy & Prince, 1993; Rubach & Booij, 1985; van der Hulst, 1996), the coexistence of the two opposite edge-based secondary stress patterns within a single system poses a challenge for most of the hitherto proposed accounts.

**Table 1. Foot-based approach with gradient alignment**

	ALL-Ft-L	ALL-Ft-R
<b>a. rightward iteration</b>		
⇒ i. (,σ σ) (,σ σ) σ ('σ)	** (2), (*****)	**, **** (6)
ii. (,σ σ) σ (,σ σ) ('σ)	***! (3), (*****)	*, **** (5)
iii. σ (,σ σ) (,σ σ) ('σ)	*, ***! (4), (*****)	*, *** (4)
<b>b. leftward iteration</b>		
⊖ i. ('σ σ) σ (,σ σ) (,σ)	***, ****!* (8)	* (1), (****)
ii. ('σ σ) (,σ σ) σ (,σ)	**, ****!* (7)	** (2), (****)
⇐ iii. ('σ σ) (,σ σ) (,σ σ)	**, **** (6)	** (2), (****)

First, the pattern is problematic from the point of view of Optimality theoretic accounts of rhythmic stress based on foot structure, regardless of whether the mechanism employed is gradient alignment (Alber, 2005; McCarthy & Prince, 1993) or categorical alignment combined with licensing (Kager,

2001, 2005). The gradient alignment approach fails to generate both the concurrent secondary stresses in the initial and final positions, as well as the internal lapses adjacent to the peak that occur on both sides of the peak. Gradient alignment requires that all feet are pushed towards the left or the right edge of the word. Depending on whether ALL-FT-L ('the left edge of every foot is aligned with the left edge of prosodic word'; McCarthy & Prince, 1993) or ALL-FT-R ('the right edge of every foot is aligned with the right edge of prosodic word'; McCarthy & Prince, 1993) is the dominating constraint in the hierarchy, the rightward or the leftward pattern can be generated, but never both. The evaluation of candidates is shown in Table 1; the violation marks referring to the syllable carrying main stress are given in brackets as irrelevant to the point of discussion. Here and below, only candidates with correctly marked lexical stress are considered. In Table 1a, the correct output (1ai) requires the ranking ALIGN-FT-L >> ALIGN-FT-R. The contradictory ranking is required for (1bi) to win: ALL-FT-R >> ALL-FT-L. However, this setting would produce an incorrect result for words with main stress on the final syllable: \*σ(σ σ)(,σ σ)( 'σ).

The Ukrainian pattern is also problematic from the perspective of the licensing approach of Kager (2001, 2005). This approach allows to accommodate a sequence of two unstressed syllables in the vicinity of main stress, both to the right and to the left, either *via* LAPSE-AT-PEAK ('every lapse must be adjacent to the peak'; Kager, 2001) or \*LAPSE-IN-TROUGH ('no sequences of two unstressed syllables between secondary stresses'; Kager, 2005), which must dominate the general \*LAPSE constraint ('no two adjacent unstressed syllables', Selkirk, 1984). Yet, it offers no mechanism of placing secondary stresses at the opposite word edges simultaneously (cf. Table 2). The point is that the non-gradient ALIGN-WD-L and ALIGN-WD-R ('every prosodic word starts/ends with a foot'; Kager, 2001) operate in terms of foot units. While this solution is feasible for systems which exhibit clear iambic or trochaic patterns, it is problematic for Ukrainian whose foot structure (iambic or trochaic) is far from obvious. In hexasyllabic words, this approach correctly generates initial secondary stress in words with main stress at the right word edge, as in ,*muni*,*cypali*'*tet* (2a). However, in words with main stress at the left edge of the word, such as '*lahody*,*tyme*,*te* (2b), the fully parsed and incorrect output \*[( 'laho)(,dyty)(,mete)] (2biii) violates a subset of well-formedness conditions relative to the correct output with final stress [( 'laho)dy(,tyme)(,te)] (2bi).

**Table 2. Foot-based approach with categorical alignment and licencing**

	ALIGN-WD-L	ALIGN-WD-R	LAPSE-AT-PEAK	*LAPSE
<b>a. rightward iteration</b>				
⇒ i. (,muni)(,cypa)li('tet)				*
ii. (,muni)cy(,pali)('tet)			*!	*
iii. mu(,nicy)(,pali)('tet)	*!			
<b>b. leftward iteration</b>				
⊖ i. ('laho)dy(,tyme)(,te)				*!
ii. ('laho)(,dyty)me(,te)			*!	*
←iii. ('laho)(,dyty)(,mete)				

Note also that while the lapse on the third syllable in the correct output ['lahody,tyme,te] can be modelled without reference to foot structure (in terms of LAPSE-AT-PEAK or \*LAPSE-IN-TROUGH), the parsing of the word into feet raises several questions. Assuming parsing is trochaic in Ukrainian, is there a unary foot at the end of the word, like in candidates (2bi) and (2bii)? If so, under what conditions are unary feet allowed in Ukrainian? Would candidate [( 'la)ho(dy,ty)(me,te)] with leftward iambic parsing also be a viable output? Further, putting aside the iambic/trochaic controversy, it seems that the incorrect parsing \*[( 'laho)(,dyty)(,mete)] (2biii) would emerge as suboptimal only through the assumption of priority of rhythmic beats over foot structure. Apparently,

if foot parsing were imposed in such cases, it would have to be generated in accordance with the “perfect grid” requirements: a constraint demanding that a stress mark be aligned with the edge of the word.

A solution seems to be offered by approaches that do not appeal to the metrical foot but refer directly to the grid (Gordon, 2002). In Gordon’s (2002) approach, the attraction of stress to the word edges is ensured by ALIGN EDGES, which requires that the edges of level 0 of a prosodic word be aligned with a level 1 grid mark (p. 497). However, the family of \*LAPSE constraints expanded along the lines suggested by Gordon (2002) does not include any equivalent of LAPSE-AT-PEAK or \*LAPSE-IN-TROUGH. Iteration of subsidiary stress is modelled in terms of gradient alignment, reformulated in terms of the metrical grid: ALIGN ( $X_1$ , L) and ALIGN ( $X_1$ , R) require that every grid mark of level 1 (corresponding to secondary stress) be aligned with the left/right edge of level 0 of grid marks in a prosodic word. As a result, the predicted pattern is compatible with either the left or the right side of the rhythmic mirror attested in Ukrainian, but not with both. In Table 3, ALIGN EDGES needs to be ranked the highest to ensure the occurrence of polar beats at the left/right edge of the prosodic word. The rightward iteration in (3a) is effected by the ranking ALIGN ( $X_1$ , L) >> ALIGN ( $X_1$ , R); the leftward iteration in (3b) can only be modelled in terms of the opposite ranking of the two constraints.

**Table 3. Grid-based approach including gradient alignment**

	ALIGN EDGES	ALIGN ( $X_1$ , L)	ALIGN ( $X_1$ , R)
<b>a. rightward iteration</b>			
⇒ i. ,muni,cypali'tet		** (2)	***, ***** (8)
ii. ,municipali'tet		***! (3)	** , ***** (7)
iii. mu,nicy,pali'tet	*! (1)	*, *** (4)	** , ***** (6)
<b>b. leftward iteration</b>			
⊖ i. 'lahody,tyme,te		***, *****! (8)	** (2)
⇐ ii. 'laho,dytyme,te		** , ***** (7)	*** (3)
iii. 'laho,dyty,mete	*! (1)	** , ***** (6)	*, *** (4)

**Table 4. A combination of the grid-based approach and the licensing approach**

	ALIGN EDGES	LAPSE-AT-PEAK
<b>a. rightward iteration</b>		
⇒ i. ,muni,cypali'tet		
ii. ,municipali'tet		*!
iii. mu,nicy,pali'tet	*!	
<b>b. leftward iteration</b>		
⇒ i. 'lahody,tyme,te		
ii. 'laho,dytyme,te		*!
iii. 'laho,dyty,mete	*!	

In the light of the discussion above, it is clear that the Ukrainian mirror-image stress pattern can be generated if and only if (i) foot-based constraints are replaced by grid-based constraints, and (ii) gradient alignment pushing all secondary stresses towards the left or the right edge of the word is abandoned. With the grid-based ALIGN EDGES accompanied by the licensing LAPSE-AT-PEAK, we obtain the desired results, as shown in Table 4.

## Conclusion

We have demonstrated that the Ukrainian stress pattern cannot be accommodated by current metrical theories employing the mechanism of foot alignment. An alternative account has been suggested based on the licensing theories that appeal directly to the grid. Further research is needed to predict the consequences of the hybrid approach that we propose here for the factorial typology of stress patterns.

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## Conceptual transfer in connecting events in Japanese-English bilingual teenagers' narratives

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**Abstract.** Cognitive linguists have argued that the same events can be conceptualized and described differently in different languages (Jarvis, 2011; Langacker, 2008). Minami (2011), for example, report that Japanese-English bilingual children used more connectives to denote temporality in their Japanese narratives, whereas they used more connectives of causal and adversative (C&A) relationship in their English stories, revealing differences in event construal in each language – preference in Japanese for describing what is happening whereas preference in English for focusing on the actions and reasons (Ikegami, 2006, 2011). However, few studies have compared bilinguals' use of connectives with that of their monolingual peers in each language to detect cross-language interaction in the way they connect events, and how that may change over time as children experience further bilingual language use. The current study examines if transfer is observed in how bilingual children sequence events in each language, and if there are any developmental trends. Five teenage Japanese-English bilinguals who regularly use the two languages in their daily lives told stories based on a wordless picture book “Frog, where are you?” (Mayer, 1969) in Japanese and English separately, at two sessions within an interval of two years. We analyzed if cross-linguistic influence is observed by comparing the use of connectives between bilingual and age-matched monolingual children in each language, and if the way bilinguals describe the events in each language change over time. Results show that bilingual children's Japanese narratives have significantly more expressions of C&A meaning compared with those of monolingual children, suggesting influence from English. Developmental analysis further reveals an increase in the use of both C&A connectives in the Japanese stories and temporality connectives in the English stories, indicating a bi-directional interaction between the two languages, leading to a possible convergence of the event construal patterns as they grow older.

**Keywords:** Japanese/English bilinguals, narratives, connectives, event construal, cross-linguistic influence, longitudinal analysis

### Introduction

The current study examines if cross-linguistic influence (CLI) is observed in how Japanese-English bilinguals connect events in narratives, and to capture the developmental trends within the framework of cognitive linguistics. In this section the key concepts of this study – conceptualization, event construal, conceptual transfer and convergence – are introduced, which will be followed by the specific differences between Japanese and English in connecting events in discourse.

#### *Conceptualization of events and event construal*

It has been argued that the same events can be conceptualized and described differently in different languages (Jarvis, 2011; Langacker, 2008). Jarvis (2011) defines conceptualization as the process of choosing concepts and structuring them according to a particular perspective of a situation. Since not all information on events can be verbalized, speakers choose certain aspects of the event to be given attention to. They then map the information on to linguistic forms, and the linguistic manifestation of different patterns of conceptualization is referred to as event construal (Jarvis, 2011). As different languages have language specific patterns of event-form mapping, the same event can be conceptualized and verbalized differently in different languages. This implies that children “acquire” language specific patterns of conceptualization: they learn to pay attention to a particular aspect of motion or event and learn the language-specific pattern of verbalization.

### ***Conceptualization in bilingual speakers and cross-linguistic influence (CLI)***

If different languages express the same event in different ways, we can naturally expect CLI in the ways bilinguals verbalize events. Jarvis (2007), and Jarvis and Pavlenko (2008) put forth the Conceptual Transfer Hypothesis, which states that 1) CLI is expected at the level of conceptualization among bilingual speakers, and 2) certain aspects of the use of one language originate from the concept or conceptualization patterns acquired in another language. For example, conceptual transfer can manifest itself in a bilingual's choice of lexical items to refer to objects and actions, or syntactic/discursive structures to refer to events and situations.

Jarvis and Pavlenko (2008) and Pavlenko (2011) further claim that bilingualism/multilingualism can cause conceptual restructuring, i.e. changes in concepts and conceptualization observed in multilingual speakers. In particular, when there is bi-directional influence convergence can occur, i.e. bi/multilingual speakers create a hybrid pattern of conceptualization by incorporating features of both languages. Typical cases of convergence include those in Brown and Gullberg (2008, 2011), where construal in L2 is affected by that of L1 and vice-versa in expressions of directionality known as Path in Japanese and English.

### ***Event construal in Japanese vs. English***

As the current study involves the use of connectives in Japanese-English bilinguals, we present the features of the two languages in terms of how events are connected in narratives, within the framework of event construal. Ikegami (2006, 2011) argues that Japanese has subjective construal; it has a preference for describing what is happening from within as if one is experiencing the event (subjectively). This may lead to the frequent use of temporal connectives in narratives. On the other hand, English has objective construal; English speakers tend to describe events from outside (objectively, adding evaluation and interpretation), which may explain the frequent use of causal and adversative (C&A) connectives.

Minami's (2011) analysis of narratives taken from 40 Japanese-English bilingual children (8 to 13 years old) reports that these children used more connectives of C&A relationship in their English stories compared to the Japanese stories. Taking a sociocultural approach, he attributed the difference to cultural differences, arguing that this is a manifestation of children's preference for explicitness in English and for ambiguity in Japanese. Although the data was analyzed using a different approach, the results of the study are compatible with the hypothesis that Japanese has subjective construal and English has objective construal. However, there have been few studies on CLI connecting events; few studies have compared bilinguals' use of connectives with that of their monolingual peers in each language to detect cross-language interaction in the way they connect events. Furthermore, longitudinal studies investigating the effect of bilingual development further are rarely conducted.

### ***Research questions***

Two research questions are addressed in the current study:

1. Will there be transfer of event construal in connecting events in Japanese-English early successive bilingual teenagers?
2. Will there be changes over time in the patterns of conceptual transfer, as they experience further bilingual language use?

Regarding the first research question, since English has an objective construal and tends to interpret from an outside viewpoint with frequent use of causal and adversative connectives, it could be hypothesized that the bilingual teens will use more of those types of connectives in the Japanese narratives, compared to their monolingual peers, due to an influence of English construal. On the other hand, Japanese has subjective construal with a preference for describing events chronologically, rather than with a logical sequence using temporal connectives. Thus, bilinguals are expected to use more temporal connectives in their English narratives compared to their monolingual peers due to a transfer of Japanese construal.

Regarding the second research question, since the length of exposure and the frequency of use are considered as some of the factors that affect conceptual transfer (Pavlenko, 2011), developmental changes would be observed over time.

## Method

### *Data*

Five Japanese-English early successive bilingual teenagers (2 male, 3 female) living in Japan participated in the study. Data collection was conducted at two time periods (Time 1, Time 2) at the age of 12 and 15, respectively. Although the age of acquisition varies from zero to eight years old, all of them regularly use the two languages on daily basis. They use Japanese with their family, community members, as well as friends at school. Their school language is not the same as the community language, but they attend international schools (International Baccalaureate Programme), where English is the medium language of instruction. According to parental reports and the number of utterances of the narratives, all participants are considered to be balanced in the two languages.

Japanese-speaking monolingual teenagers (3 males, 1 female) also participated in the study to provide narratives once at the age of 13. The data of five 11-year-old English-speaking monolinguals (3 males, 2 females) were utilized from the Child Language Data Exchange System (CHILDES) (MacWhinney, 2000; Pearson, 2002).

Both bilingual and monolingual teenagers were asked to tell a story based on the wordless picture book, "Frog, where are you?" (Mayer, 1969). The bilinguals' narratives were elicited separately in the two languages at two sessions within an interval of two years. At each interval, the narration in the two languages took place in the same session. All the participants told the story in English first, then in Japanese, with some intermission.

### *Coding and analysis*

All the connectives (both lexical and grammatical) used in the narratives were divided into three types such as causal, adversative, and temporal connectives, each of which includes both lexical and grammatical forms. Japanese and English examples of connectives are provided in Table 1.

To detect bidirectional conceptual transfer, the use of connectives in bilinguals and age-matched monolingual teens in each language were compared. Secondly, to detect any changes over time, the results for Time 1 and Time 2 were compared.

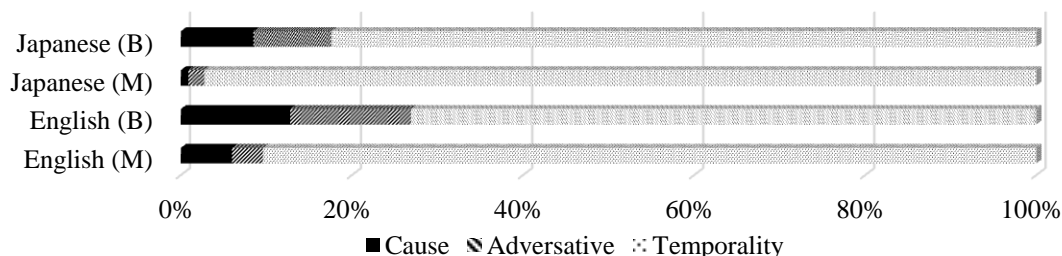
**Table 1. Classification of types and functions of different connectives and examples**

Type of connectives	Function in sentences	Japanese examples (Miyata & Inaba, 2014)	English examples (Berman, 2009)
Causal	Lexical	nazekatoiuuto	the reason is...
	Grammatical	dakara/date/de/kara/node	because/therefore/so
Adversative	Lexical	-	-
	Grammatical	demo/kedo/noni/temo	but/although
Temporal	Lexical	kondo/sonotoki/tsugini	first/then/after a while
	Grammatical	de/sokode/sorekara/soshitara/soshite/suruto/to/ V-tara/V-te/-aidani/-tokini	after/before/and (coordination)

## Results

### *Comparison of bilinguals and monolinguals in each language*

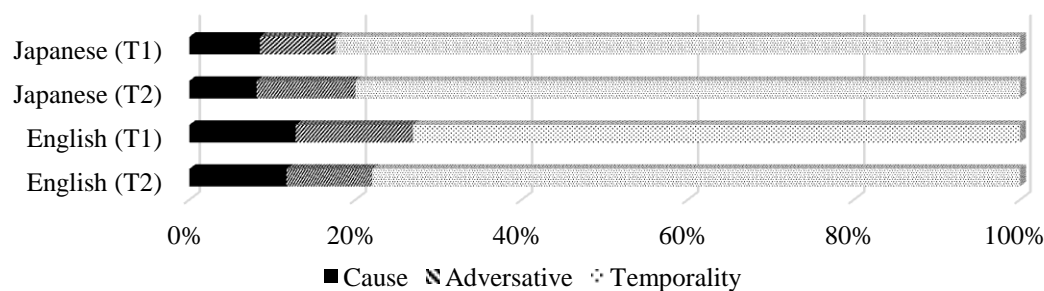
Figure 1 displays the ratio of different connectives (cause, adversative, temporality) used by monolinguals (M) and bilinguals (B) at Time 1. In Japanese, bilingual teenagers used causal and adversative connectives more frequently than monolinguals (bilinguals 17.6%, monolinguals 0.9%), and this is also reflected on the bilinguals' smaller percentage of temporal connectives (bilinguals 82.4%, monolinguals 99.1%). In English, bilinguals used more causal and adversative connectives compared to monolinguals (bilinguals 26.9%, monolinguals 9.6%).



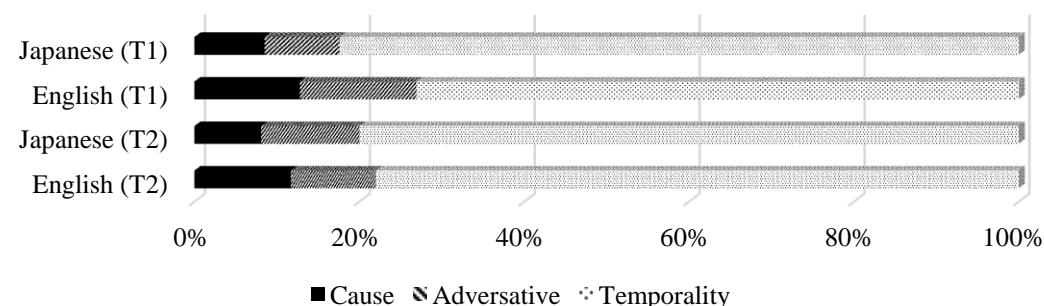
**Figure 1. The ratio of different connectives among all connective use: Bilinguals vs. monolinguals**

### *Developmental analysis (Bilinguals Time 1 vs. Time2)*

Figure 2 shows the ratio of different connectives used by the bilinguals at Time 1 (T1) and Time 2 (T2) in each language. In Japanese, although there does not seem to be a significant overall difference between Time 1 (17.6%) and Time 2 (20.0%), the percentages of causal and adversative connectives slightly increased at Time 2. In English, bilinguals produced smaller proportions of causal and adversative (22.0%) and higher proportions of temporal connectives (78.0%) at Time 2 compared to Time 1 (cause/adversative: 26.9%, temporality: 73.1%).



**Figure 2. The ratio of different connectives among all connective use: Comparison of Time 1 and Time 2 in each language among the bilinguals**



**Figure 3. The ratio of different connectives among all connective use: Comparison of Japanese and English at Time 1, Time 2 among the bilinguals**

Figure 3 provides the same sets of data as those shown in Figure 2 with a close focus on the difference in the distribution pattern of different types of connectives in both languages within each session.

There is a relatively larger difference in the use of connectives in each language at Time 1 (cause/adversative 26.9% in English vs. 17.6% in Japanese), whereas the gap becomes narrower at Time 2 (cause/adversative in English 22.0% vs. 20.0% in Japanese).

## Discussion

To summarize the results briefly, in the bilingual-monolingual comparison, an influence from English to Japanese was observed with the increased use of causal and adversative connectives and the reduced use of temporality connectives in the bilingual children's Japanese narratives. However, a clear effect of Japanese on English was not found in our data. Bilinguals used more causal and adversative connectives compared to monolinguals, which is not what we expected, because bilingual teenagers were predicted to use more temporal connectives in English than English-speaking monolinguals due to an influence from Japanese. This might be due to the age of the English-speaking monolingual teenagers included into the study. They are relatively younger than the bilingual participants and thus possibly still in a process of acquiring the language-specific pattern of describing events in English, resulting in the use of less causal and adversative and more temporal connectives. In a future study, an analysis of age-matched English monolinguals is expected to closely address whether an influence occurs bi-directionally between Japanese and English, especially at Time 1.

In the Time 1 vs. Time 2 comparison, our data suggests bi-directional transfer as bilingual children grow older. The relatively large difference in the use of connectives in each language at Time 1 becomes narrower at Time 2. This indicates that bilinguals produced connectives more similarly in both languages, which could be interpreted as a sign of convergence. In other words, the language-specific use of connectives in each language converges through increased contact in two languages. This is in line with the notion of restructuring and convergence (Jarvis & Pavlenko, 2008; Pavlenko, 2011; Vanek & Hendriks, 2015). It is also compatible with the prediction that factors such as frequency of use and the length of exposure can affect event construal (Pavlenko, 2011).

## Conclusion

The current study argued that CLI seems to occur at the level of conceptualization when connecting events in narratives among bilingual speakers. The bidirectional feature of CLI observed in the longitudinal analysis further supports the idea of convergence or the gradual construction of hybrid conceptualization in the bilingual speaker's mind. The study thus suggests that conceptualization patterns can change through bilingual experience. Due to the small sample size, statistical analysis was not possible and, as a result, the study is inconclusive. More firm evidence based on a larger sample and statistical analysis is necessitated.

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## An examination of the effect of input quality on subject realization in Japanese-English bilingual children

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**Abstract.** Two language systems in a bilingual's mind interact in grammatical structures that involve a syntax-discourse/pragmatics interface and a partial overlap at a superficial level (Hulk & Müller, 2000). Previous studies on cross-linguistic influence (CLI) on subject argument realization have suggested that an influence takes place unidirectionally from overt-subject to null-subject languages, resulting in the overuse of overt subjects. Meanwhile, the few studies that addressed the issue of whether the quality of input received by bilingual children from their caregivers is a source of the phenomenon have yielded mixed results (Hauser-Grüdl et al., 2010; Mishina-Mori et al., 2015; Nakano, 2019; Paradis & Navarro, 2003). The present study examines the effect of input quality on subject realization by analyzing the longitudinally recorded speech of two caregivers of Japanese-English simultaneous bilingual children (Mishina, 1997). Overt subjects in Japanese were coded for discourse-pragmatic features and child-directed speech (CDS) functions. A comparison was made between the caregivers and their child (the data taken from Mishina-Mori et al., 2015) in terms of the proportions of contextually infelicitous overt subjects to explore whether caregivers display similar tendencies to those of their child. A discourse-pragmatic analysis revealed that one of the bilingual caregivers showed a significant difference from her child in the rates of overt subjects with little discourse-pragmatic motivation, in accordance with previous findings (Hauser-Grüdl et al., 2010; Mishina-Mori et al., 2015; Nakano, 2019). However, another parent appeared to show a tendency of overusing overt subjects as is widely reported in bilingual children even after considering CDS functions. However, this could be due to the parent's unique speech practice, suggesting no sign of CLI. Thus, the findings indicate that the quality of input is not a determining factor that directly causes the overuse of discourse-pragmatically infelicitous overt subjects to bilingual children.

**Keywords:** bilingual children, cross-linguistic influence, subject realization, syntax-discourse interface, input

### Introduction

#### *Cross-linguistic influence in subject realization*

Over the years, it has been reported that bilingual children that acquire two languages simultaneously develop a separate system for each language. However, this does not mean that the two systems are always independent and intact from cross-language interactions. In other words, the two languages of simultaneous bilingual children may interact with each other, but importantly, such interaction takes place in a predictable manner rather than in a random fashion. Hulk and Müller (2000) proposed that cross-linguistic influence (CLI) is likely to occur if the two languages partially overlap in a structure at the syntax-discourse-pragmatics interface, and this influence is observable unidirectionally from a language with a single option to the other language with multiple options. Subject realization is a structure wherein CLI is expected to occur based on Hulk and Müller's (2000) prediction. Previous studies have provided supportive evidence that an influence goes in a predicted direction from an overt-subject to a null-subject language (Hacohen & Schaeffer, 2007; Mishina-Mori, Matsuoka & Sugioka, 2015; Nakano, 2019; Paradis & Navarro, 2003; Serratrice, Sorace & Paoli, 2004). For example, Mishina-Mori et al. (2015) showed that two Japanese-English bilingual two year olds, Rie and Ken, used more overt forms with little discourse-pragmatic function compared to their monolingual peers, Aki and Ryo, from Miyata (1995) – bilinguals and monolinguals averaging approximately 40% and 20%, respectively (Rie 35%, 16/46; Ken 47%, 9/19; Aki 16%, 7/44; Ryo 25%, 5/20). Nakano (2019) replicated the study with another Japanese-English bilingual infant, Naoki

(Ota, 1998), and reanalyzed Aki by adding more data. The author also added another Japanese monolingual, Nanami, from the Miyata corpus (Miyata, 2012) and reported a similar tendency: The ratio of the low-informative subjects in the bilingual child was 38.8% (40/103), whereas that of the monolingual peer was much smaller (18.6%, 15/80). Thus, these studies reported that bilingual children who spoke an overt-subject and null-subject language combination tended to produce overt subjects more frequently than their monolingual peers.

Although the above mentioned studies seem consistent with Hulk and Müller's proposal, it might be possible that the input received by bilingual children from their primary caretakers, their parents in most cases, is a factor that causes such an excessive use of overt subjects, independently of CLI. Put differently, bilingual children's parents may also be bilingual speakers in many cases, thus providing input affected by the other language, which may eventually be transferred to their children. Therefore, the characteristics of parental input must be examined to better understand bilingual children's use of subject in a null-subject language.

Thus far, the few studies that have addressed this issue have offered mixed results. On the one hand, if we assume that parental input could be a source of bilingual children's pattern of subject realization, there should be a consistency in the rates of overt subjects between children and their parents. However, such consistency itself is not a determining reason to claim the effect of input on bilingual children's subject realization, because CLI might take place individually/separately in both bilingual children and their parents (Paradis & Navarro, 2003). On the other hand, if there is no consistency between children and parents, then this suggests that there would be no input effect on bilingual children's use of subjects. In Paradis and Navarro (2003), the bilingual child and his parents showed similar percentages for overt subjects, especially in unnecessary contexts, where discourse-pragmatic purposes, such as newness and contrast, were not involved. In contrast, Hauser-Grüdl, Guerra, Witzmann, Leray, and Müller (2010), Mishina-Mori et al. (2015), and Nakano (2019) did not find such a correspondence between bilingual children's production and their input. For instance, in Nakano's (2019) analysis of a Japanese-English bilingual child and his caregiver, the ratio of discourse-pragmatically unnecessary subjects in the bilingual child was significantly larger (38.8%) compared to that of the adult caregiver (in his case the researcher) (20%). The ratio was even lower (6.3%) when the overt subjects with child-directed speech (CDS) function (e.g. expansion or confirmation), which were used in response to the child's utterances, were excluded from the analysis. Thus, the results suggest no direct effect of parental input. The current study is an attempt to add further evidence to the above claim by investigating the effect of input received by bilingual children. In doing so, we can gain a better understanding of the source of the unique pattern of subject use observed among bilingual children.

### ***Subject realization in Japanese and English***

Japanese is a null-subject language with overt and null options. An appropriate choice of these syntactic options is driven by discourse-pragmatic factors. More specifically, if referents are recoverable from the context, they are likely to be realized by null forms rather than by overt forms (pronouns or noun phrases) which leads to the referents being discourse-pragmatically infelicitous. Overt forms are chosen in the contexts where discourse-pragmatic features are involved (see *Coding* for the full list). In addition, subject arguments are followed by distinct case markers: -GA for a subject and -WA for a topic. Although noun phrases with -GA or -WA are located in different positions in a syntactic hierarchy, the current study includes both as a grammatical subject, since they may be perceived similarly from the perspective of young children due to a partial overlap at the level of superficial structure (Hulk & Müller, 2000). In contrast to Japanese, English is an overt-subject language in which any omission of subject arguments is not permissible in principle, except for a few contexts, including imperatives, informal conversations with expletives, questions involving auxiliary drop, and diary drop (Orfitelli & Hyams, 2012).

### ***Research question***

The present study addresses the following research question: can the input frequency account for the unique pattern of subject realization observed in bilingual children?



## Method

### *Data*

Longitudinally audio-recorded naturalistic conversations between two 2- to 3-year-old simultaneous bilingual children, Rie and Ken (Mishina, 1997), and their interlocutors (INT hereafter) were used for the analysis. For Rie and Ken, the data were partially analyzed for the effect of parental input on subject realization in Mishina-Mori et al. (2015), but we conducted a re-analysis of the INTs' speech by adding more files. The primary INTs in Japanese conversations were mostly the children's mothers.

Rie and Ken were exposed to both languages starting at birth. Japanese input came from their mothers, who were native speakers of Japanese and highly proficient in English. English input was provided by their fathers and caregivers at daycare settings. Both children were roughly balanced in each language, although the amount of exposure slightly differed: the ratio of exposure to Japanese and English was approximately 60:40 for Rie and about 40:60 for Ken.

### *Coding*

The coding schema for coding forms and discourse-pragmatic features of subject arguments were adapted from Mishina-Mori (2007) and Mishina-Mori et al. (2015). Subjects in an utterance with a verb were coded first for form, such as null, lexical, pronominal, or demonstrative. Overt subjects coded as either lexical and pronominal were further coded for discourse-pragmatic features, such as newness, query, emphasis, contrast, and absence (Allen, 2000; Clancy, 1993, 1997; Guerriero, Oshima-Takane, & Kuriyama, 2006; Paradis & Navarro, 2003; Serratrice et al., 2004). On the one hand, if overt subjects involved any of these features, they were considered as discourse-pragmatically appropriate. On the other hand, if they did not involve the same features, they were categorized to be discourse-pragmatically inappropriate or unnecessary. Finally, overt subjects classified as being infelicitous in terms of discourse-pragmatics were further coded for CDS functions, adopting the coding scheme used in Nakano (2019). This was done in order to examine whether INTs used discourse-pragmatically inappropriate overt subjects to adjust their speech to their child. Discourse-pragmatically inappropriate overt subjects were initially categorized for either initiation or response (De Houwer, 1990). Only those that appeared as initiation were further coded for detailed CDS functions (Ervin-Tripp & Strage, 1985; Snow, 1987), such as confirmation (where parents repeated what the children just said), expansion (where they provided a correction or a full expression of the children's telegraphic utterances), and others. All the coding processes were conducted following the CHAT convention (MacWhinney, 2000).

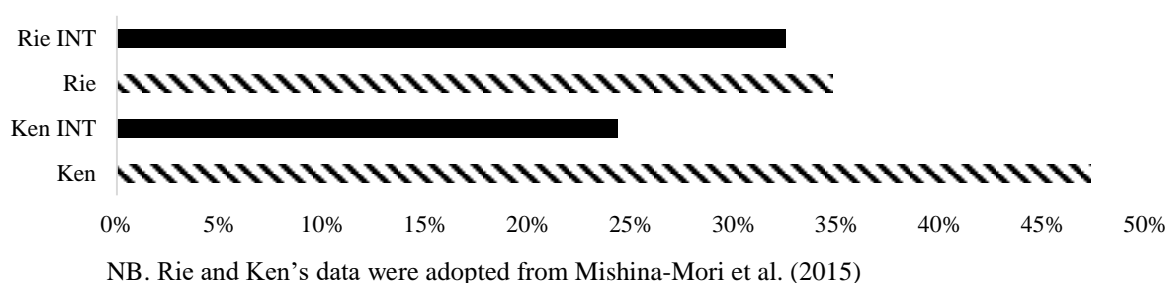
### *Analysis*

First, a discourse-pragmatic analysis of the INT data was conducted to calculate the proportions of discourse-pragmatically inappropriate overt subjects. Second, an analysis of CDS functions was conducted to calculate the ratio of overt subjects that appeared in different conversational turns, such as initiation and response, and the ratio of discourse-pragmatically inappropriate overt subjects without CDS functions. The data of two Japanese-English simultaneous bilingual children, Rie and Ken, was used from Mishina-Mori et al. (2015) in order to compare the use of discourse-pragmatically inappropriate overt subjects in Japanese in children and parents' productions. All the analyses were run using CLAN (MacWhinney, 2000).

## Results

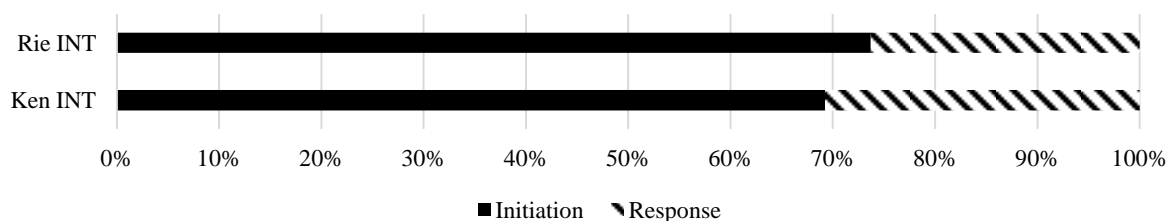
Figure 1 displays the rates of discourse-pragmatically inappropriate overt subjects used by the bilingual INTs compared to those of their children (Mishina-Mori et al., 2015). Overall, both INTs produced discourse-pragmatically felicitous overt subjects less frequently than their children: Rie's INT 32.5% (76/234), Rie 35% (16/46), Ken's INT 24.3% (65/267), Ken 47% (9/19). A statistically significant difference was found only between Ken and his INT (Ken-INT:  $\chi^2(1) = 4.903, p < .05$ ), but

not between Rie and her INT (Rie-INT:  $\chi^2(1) = 0.093$ , *n.s.*). As one of the bilingual INTs demonstrated a similar tendency of overusing overt subjects to her bilingual child, the possibility that parental input may transfer to the child cannot be denied. However, such a pattern might be due to CDS functions employed as a means of scaffolding a child's utterances by intentionally using overt subjects for communicative purposes.



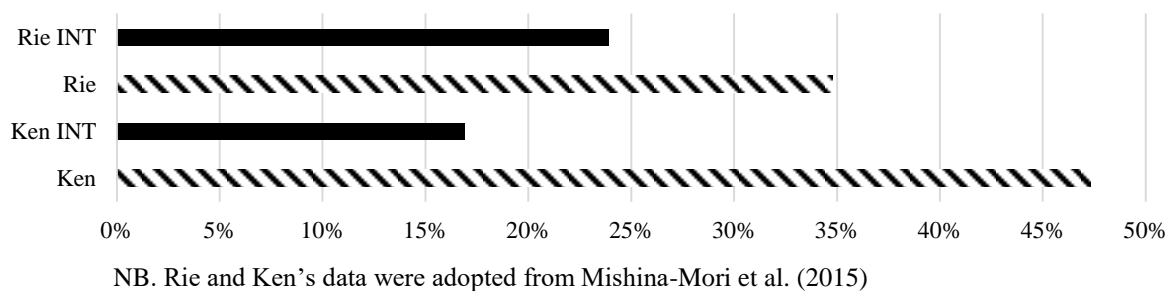
**Figure 1. The rates of discourse-pragmatically inappropriate overt subjects used by bilingual INTs and their children**

Figure 2 shows the proportions of conversational turns (initiation, response) in which INTs produced discourse-pragmatically unnecessary overt subjects. The analysis revealed that some portions of discourse-pragmatically inappropriate overt subjects were actually used in responding to the children and involved CDS functions, such as confirmation and expansion. This indicates that each INT's tendency of using discourse-pragmatically inappropriate overt subjects partly differs from that of her child qualitatively. In other words, bilingual INTs did not simply overuse unnecessary subjects but rather used them for communicative purposes in engaging in the conversations with their children. Therefore, the next analysis focused exclusively on discourse-pragmatically inappropriate overt subjects used as initiation, which did not involve either discourse-pragmatic features or CDS functions.



**Figure 2. Conversational turns of discourse-pragmatically inappropriate overt subjects**

Figure 3 displays the comparison of the rates of discourse-pragmatically inappropriate overt subjects used by bilingual INTs compared to those of their children (Mishina-Mori et al., 2015). In this analysis, both discourse-pragmatic features and CDS functions were considered in examining the felicitousness of overt subjects. Both INTs showed a decline in the proportions of overt subjects used in discourse-pragmatically inappropriate contexts after eliminating those used for CDS functions: Rie's INT 23.9% (56/234), Ken's INT 16.9% (45/267). The difference was statistically significant between Ken and his INT ( $\chi^2(1) = 10.784$ ,  $p < .01$ ). Although Rie's INT seemed to produce overt subjects less frequently than Rie, the difference was not statistically significant ( $\chi^2(1) = 2.370$ , *n.s.*).



**Figure 3. The rates of discourse-pragmatically inappropriate overt subjects in bilingual children and INTs (CDS considered)**

## Discussion

The current study explored whether parental input could account for bilingual children's excessive use of overt subjects in discourse-pragmatically unnecessary contexts. A substantial number of previous studies have reported that bilingual children acquiring an overt-subject and null-subject language combination tend to produce overt subjects more frequently than their monolingual peers, especially in discourse-pragmatically uninformative contexts (Hacohen & Scheaffer, 2007; Mishina-Mori et al., 2015; Nakano, 2019; Paradis & Navarro, 2003; Serratrice et al., 2004). Although such a phenomenon can be successfully explained by the notion of a structural overlap and syntax-discourse-pragmatic interface (Hulk & Müller, 2000), the quality of input has also been considered as a potential factor that might determine bilingual children's tendency in subject realization. The latter factor has been investigated in a few studies (Hauser-Grüdl et al., 2010; Mishina-Mori et al., 2015; Nakano, 2019; Paradis & Navarro, 2003) that provided inconsistent results. The current study thus contributes to the debate on the effect of input quality by offering empirical evidence based on the analyses of the parental input of two Japanese-English bilingual children.

A significant difference was found in one of the bilingual children, Ken, and his INT, in line with previous studies, such as Hauser-Grüdl et al. (2010), Mishina-Mori et al. (2015), and Nakano (2019), which also did not find a consistency between children and their INTs. Thus, the result from Ken's INT and those of the above-mentioned studies suggest that bilingual children's tendency for overusing subjects, especially in discourse-pragmatically inappropriate contexts, cannot be merely attributed to input.

However, the difference was not significant between another bilingual child, Rie, and her INT. This might be due to the higher rates of discourse-pragmatically inappropriate overt subjects produced by Rie's INT compared with Ken's INT and with other Japanese monolingual INTs. According to Nakano (2019), two Japanese-speaking monolingual INTs (the INTs of Aki and Nanami) (Miyata, 1995; 2012) exhibited 4.9% and 11.5% of discourse-pragmatically uninformative overt subjects, respectively, when CDS functions were considered, yielding a statistically significant difference from Rie's INT (Rie's-Aki's INT:  $\chi^2(1) = 50.425$ ,  $p < .01$ , Rie's-Nanami's INT:  $\chi^2(1) = 20.536$ ,  $p < .01$ ). Thus, Rie's INT seemed to undergo CLI similarly to her child, possibly resulting in the child's overuse of overt subjects through transfer. However, this may not be the case for the following reasons. First, Rie's INT often used "mama" to call herself in the conversation with her child. In Paradis and Navarro's (2003) analysis of parents' productions, such a noun phrase that appeared as a subject of the analyzed sentences was classified as CDS and independent of the analysis in terms of discourse-pragmatic informativeness. However, the current study included it into the discourse-pragmatic analysis, possibly leading to an increase in the number of inappropriate overt subjects, as it was considered to be discourse-pragmatically uninformative especially for not involving newness (i.e. whether a referent was recoverable from physical or discourse contexts). The second possible reason is that the recording sessions analyzed included a scene wherein the INT told stories based on picture books to her child and explicitly mentioned the characters in stories with noun phrases in order to

guide the child's attention. These noun phrases were considered inappropriate based on the discourse-pragmatic criteria as they did not meet any of the features, particularly absence (i.e. whether a referent was available in the same physical space as that where the conversation took place). Furthermore, Rie's INT sometimes referred to a researcher, who was present in the same physical space during the sessions, using the *oneechan* 'a young woman' in Japanese. Such an overt subject was categorized as discourse-pragmatically inappropriate for not involving either newness or absence together with others. Therefore, the pattern of subject realization observed in Rie's INT would not have resulted from an influence from English but from her own speech practice. A future study will provide quantitative analyses on her speech pattern, offering a closer look at her productions of overt subjects.

## Conclusion

The current study addresses the question of whether the pattern of subject realization observed in bilingual children is attributed to the input they receive from their parents. The close analyses of parental input as to subject arguments revealed that parents may not have showed signs of CLI. Therefore, bilingual children's pattern of subject realization in Japanese may be attributed to CLI which takes place internally within individual bilingual children rather than to the input they receive from their primary interlocutors in daily conversations using the language.

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## **Multicultural and linguistic contexts, mixing and switching languages: First approaches on Portuguese, English and Mandarin early speakers**

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**Abstract.** Among the most diverse areas that involve bilingualism is the socio and psycholinguistic study in children and adults. Fernandez and Cairns (2010) define psycholinguistics as the area that studies the connections between language acquisition, comprehension and production, and also how language is represented and processed in the human brain. Based on the assumption that bilingualism is a phenomenon that occurs worldwide, which is also the result of a globalized society surrounded by many cases of immigration, it is undeniably important to conduct studies related to education and culture from a bi-multilingual perspective. In this study, we aim to describe and analyze from a quantitative and qualitative perspective a particular Portuguese-speaking community located in Dongguan, China, near Macau, also known as a privileged area to learn Portuguese in Asia. The study is mainly focused on code-mixing/switching in different daily life contexts, as well as to identify how multilinguals choose to express their emotions: to which language do they feel emotionally connected. Children linked to the Brazilian community in Dongguan live in an environment that favors the acquisition of different languages due to interaction with individuals from diverse cultural and linguistic backgrounds, where Mandarin, English and Portuguese are the languages that prevail. The results suggest that many parents in Dongguan support bilingual education, as a representative of several socio-cultural advantages and as a factor that leads to a promising future for their children. It is also noticed that the observed children already had an emotional connection with the language they elected for different daily life contexts and that, most times, may not be their parent's mother tongue.

**Keywords:** language acquisition, bilingualism, language and emotions, code-mixing/switching

### **Introduction**

An inevitable increase in globalization and migration has caused a drastic increase in contact with other societies. As a result, a significant amount of multicultural societies has emerged. These mixed communities lead to bi- or multi-lingual families. Children who were raised in these communities eventually identify themselves with more than one culture, and in many circumstances use different languages with each parent and/or different languages with their parents and the rest of the community, when they are grown up. According to Shaffer and Kipp (2010), "language acquisition is clearly a holistic process intertwined with the child's cognitive and social development and with their social and cultural life."

Bloomfield (1933) defines a bilingual person as one who can speak two languages with the same fluency as natives, that is, the knowledge and perfect use of a foreign language. Weinreich (1953) considered bilingualism to be the alternate use of two languages. We may introduce here the concept of code switching that occurs when the speaker switches from one language to another in a single statement. According to Ritchie and Bhatia (2013), this change may be motivated by social and psychological factors. Code switching and emotions seem to be less present in conversations on neutral topics than on personal and affective matters. According to Dewaele (2010), the speaker's strong emotional state affects execution and control over the language. For Pavlenko (2008), this is because the emotional avalanche needs to be verbalized quickly. The speaker may realize that some emotional concepts seem to be incomplete in the language he feels or considers more fragile, because it is less dominant.

When mentioning bilingualism, it is also important to bring up the code-mixing phenomenon. It is natural for bilingual speakers to mix their languages. Code-mixing has been extensively studied by Genesee (2002), among others, and it refers to the mixing of various language units and can occur when a bilingual child uses words from two or more distinct languages to form a sentence.

In 1985, Grosjean pointed out negative consequences of the “monolingual view of bilingualism,” meaning that being bilingual to him does not correspond to having the language skills of two monolinguals in one person. In 2013, Grosjean argued that more than half of the world’s population may be bilingual. Even though the existing data are not yet concrete, bilingualism is present in many age groups and diversified social positions in several countries. He also explained that from the perspective of psycholinguistics the term bilingualism can refer to knowledge and use of two or more languages and the presentation of information in two different languages or dialects on a daily basis; this definition would include along a range of different competence levels the immigrant who rudimentarily speaks the language of the host country as well as the professional interpreter who is fluent in two languages. It is therefore understood that despite the diversity among bilingual speakers, what bilinguals have in common is the use of two or more languages in their daily lives.

### *Questions and objectives*

The main objectives of the present study, still in an embryonic form, are related to those questions in bilingualism and multilingualism during early ages and in immersion contexts (Brazilians in China). Those questions also consider the importance and use of code mixing/switching and how parents interpret and accept this multiculturalism.

Based on this, we started to observe the specific Brazilian community situation in Dongguan (China) which, on a daily basis, are in contact with and use Mandarin, English and Portuguese. Also, the multilingual and multicultural aspects of the environment and how they influence the acquisition of different languages are analyzed. At the same time, it is clearly understood that most of the children are multilinguals due to their immersion in the Chinese culture and language, but their parents are not. Having this in mind, it is also our objective to understand the parent’s opinion about their children’s multilingualism, and if they recognize the language(s) that their children speak.

## **Methodology**

### *Socio-cultural and linguistic context*



**Figure 1. Dongguan location in China**

Dongguan is a city with 8,220,207 million inhabitants, located in the southern region of China (Figure 1), and belongs to the Guangdong Province. The city homes a great community of Brazilians mainly from Rio Grande do Sul, a state in south Brazil. Immigration between Brazil and China began in the 1990s, due to the development of the leather industry and the specific need of manpower with skill in the area of footwear. The Brazilian community with a population of ca. 4,000 inhabitants in December 2017, it currently ca. 3,000 Brazilian immigrants dispersed in different provinces of the southern region. It should be noted that these numbers are not supported by statistical data, since the

consulate's information source is based on the consular registration record that does not list all Brazilians.

The demand of the community in Dongguan was such that it is now possible to find Brazilian shops, restaurants, formal and informal services, and a school named Bem Me Quer. This school arose from the need of Brazilian residents, once the whole family settles, to have a place where good education and formal teaching in Portuguese (spoken in Brazil) could be offered. Dongguan's Bem Me Quer School is divided into two complexes, Maternal/Kindergarten and Elementary. In the beginning of 2018, the school had 22 staff members, including secretaries, coordinators, and teachers who work to meet the needs of sixty-seven students. The Brazilian School was inaugurated in August 2006, and its purpose is to comply with the requirements of the Brazilian Federal and State Constitutions, and the Bases of National Education. The school serves the Brazilian community in Dongguan, as well as other nationalities and is a reference in education, inclusion and childcare. Since 2018, the School has opened its doors to more and greater offer and development, serving as a host to a Brazilian University representation in China, with official online teaching and learning programs that are now very popular among the Brazilian adults interested in getting an academic degree or continuing education.

There is also an international school in Dongguan, named Eton House. It offers preschool and early education for children of all nationalities with English being the predominant language in the classrooms. The curriculum followed is that of Reggio Emilia – an educational philosophy based on the principle that children have the strong potential to learn and evolve only by relating with others. From an early age, children have contact with subjects such as Sociology, Physics, Geography, Literature and Mathematics through playful and fun activities. This promotes the development of communicative and intellectual skills.

The school has six administrative staff members, one educational counselor, and fifteen teachers. Children enjoy the modern and attractive facilities it offers. A great number of Brazilian children are enrolled at Eton House in order to continue their international education and invest in future plans, such as, being accepted at a good university abroad.

### ***Data gathering***

Besides visiting the above mentioned schools to interact with teachers and children during different daily activities, some field notes and audiovisual recordings were made at a Brazilian family's house. This is home to the 7-year-old little multilingual girl (Carla, an alias), a first-year student at Eton House International School. Carla's constant language use changes in diverse situations during daily interactions were observed and recorded (much data is currently being analyzed).

A questionnaire was prepared to be distributed among parents of multilingual children enrolled in the Bem Me Quer school and among the Brazilian parents of Eton House to investigate how they follow and perceive their children's pluricultural education and multilingualism. The questionnaires consisted of twenty open-ended questions, printed on A4 paper and sent to parents via their children's daily schedule. The school helped in the collection and distribution of the questionnaires.

## **Results**

### ***Questionnaire observations***

The results were collected at Bem Me Quer School from April 2 to 23, 2018, and at Eton House International School from April 2 to 16, 2018. To clearly and better observe preliminary results, Table 1 shows the detailed and comparative data between the two schools that were observed for this study.

It can be seen in Table 3 that the parents of the Brazilian school find that, where English, Portuguese and Mandarin predominate in conversational situations, children are able to adjust linguistically to better communicate with their entire family in expressing feelings such as affection and warmth. It is observed that even in the home environment, it is natural for some children to code switch. Also, the



choice of language for interactions with friends during play is more conscious. This is to demonstrate that they have no difficulty adapting themselves to be understood, accepted, and to feel that they belong in a group.

**Table 1. Languages spoken by children at both schools**

Spoken languages	
Bem Me Quer	46.6% 3 languages
Eton House	50% 3 languages 50% 2 languages

**Table 2. Languages spoken by children at home**

Languages spoken at home	
Bem Me Quer	Portuguese, English and Mandarin
Eton House	100% Portuguese

**Table 3. The languages for each context involving emotions**

Needing help		To play	
Bem Me Quer	53% interlocutor	Bem Me Quer	80% friends language
Eton House	66.6% code mixing	Eton House	≥ 33% English ≥ 33% Portuguese and English ≥ 33% English and Mandarin
secrets		sadness	
Bem Me Quer	60% interlocutor	Bem Me Quer	46% interlocutor
Eton House	83.3% code mixing	Eton House	83% code mixing

It was found that 46% of the children of the Bem Me Quer School choose a specific language depending on the speaker to communicate sadness: 20% use Portuguese, around 25% vary between Mandarin and English, and a small number of them choose to mix Portuguese and Cantonese. At Eton House, the predisposition for code mixing is much stronger at 83%. On the other hand, they tend to be very aware of the necessity to be understood when they need to feel safe or ask for help, therefore it can be seen that more than 50% of the kids attending the Brazilian school continue to adapt their speech to the receptor's language and, 66% of those who attend the International School code mix.

The language used to share their secrets keeps the same path, for the first group, to be adjusted depending on the person the child is interacting with. As a side note, it is also possible to add that the same happens when they tell a story, according to our data still in study.

Regarding exchanges for other languages in different situations, children of the Bem Me Quer School, adjust to the language of the interlocutor, for instance, when they play alone or with friends and family. According to one of the questionnaires received, the mother explains that her daughter playing by herself with dolls favors the Portuguese language, but when watching videos and movies or playing with friends, she tends to do so in English.

Generally speaking, the study of foreign languages is distributed as follows: 40% study English, 20% study Mandarin, and another 40% study English and Mandarin, which shows that for many parents, English is the common language at home. As for Mandarin, since most mothers are Chinese nationals, and the foreign community is immersed in this cultural and linguistic environment, Mandarin is also an important linguistic competence to acquire and develop for all.

### ***Parental attitudes to the development of children's multilingual identities: General findings***

Regarding parents' thoughts on raising a bi/multilingual child, it is noticed that they are still very confused and apprehensive, fearing the loss of their "mother tongue", facing difficulties on developing the sense of belonging to a group and consequent socialization problems of their children. Table 4 presents the summarized parents opinions on the pros and cons of child bilingual education.

**Table 4. Parents opinions on raising a bilingual child**

Advantages of the bilingual education	Disadvantages of the bilingual education
<ul style="list-style-type: none"> <li>More independent and open minded</li> <li>More flexible and respectful towards different cultures</li> <li>Better and more job opportunities</li> <li>Knowing Chinese, Portuguese and English, they can go wherever they want in the world</li> </ul>	<ul style="list-style-type: none"> <li>Delay in verbal competence</li> <li>Difficulties expressing feelings</li> <li>Not being fluent in any language</li> <li>Socialization and integration problems</li> <li>Loss of mother language</li> <li>Mixing languages and structural errors</li> </ul>

### **Single case observation: Brief interview with Carla's mother**

'She has always been immersed in the Chinese culture and society . . . she was introduced to Portuguese in her first year of life. By 18 months, we started introducing to her audios and drawings in English. At about 2 years of age, she showed initiative, perhaps growth, and curiosity, in listening to and watch cartoons in Chinese . . . The three languages are always present and mixed, nevertheless very well defined . . . she knows that Brazil exists, but she prefers China . . . My daughter speaks and writes Mandarin, English and Portuguese, so I am the one who learns from her'.

During her activities, at home, we asked Carla to color a picture (Figure 2). After that, we talked with her to try to understand her color choice.

- *Because the heart is red and red is one of the most commonly used colors in China.*
- *Yellow skin? Because I am just like that ...*
- *The ocean is blue ... and it reminds me of China ...*

Based on the picture and Carla's answers, it is possible to add, as suggested by Heller (2000), that colors are not only a matter of personal taste but also of feelings and shared experiences that are based on our world knowledge since childhood and are deeply rooted in our language and thoughts.

Therefore, this point comes to raise another important question and doubt that will deserve our attention in the future, that is, the problematic of identity and sense of belonging of the multilingual and multicultural children.

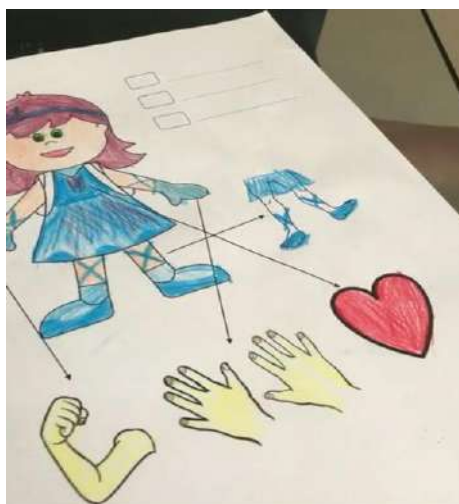


Figure 2. Carla's activity sheet

## Conclusion

Throughout the analysis of the answers obtained from the questionnaires, it is possible to observe that Brazilian children (from Eton House International School) generally use code-mixing, and not much code-switching, most probably because they are not so familiar with the languages when compared to children from the international marriages of the Brazilian school.

In sum, the main results of this preliminary study show that children are able to manage the input received on their everyday routines, and they readily use different language codes that better serve their interactional contexts. On comparing the students from both schools in Dongguang, one can see that children attending the Brazilian School use Portuguese to socialize, since the formal school context requires them to interact in Portuguese. On the other hand, for the students at Eton House school, Portuguese is the home language, the heritage language, since the formal instruction is done in English. Last, the children from Bem Me Quer School speak adequately their language(s) with their interlocutor (code-switching), while the ones from the International School have the tendency to code-mix.

All parents (both Schools) seem to be confused and apprehensive raising a bilingual child because of the fear of losing their mother tongue, even if they do understand the importance of knowing and being fluent in more than one language.

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# First language orthography influences second language speech during reading: Evidence from highly proficient Korean-English bilinguals

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**Abstract.** We examined first language (L1) orthographic effects on second language (L2) speech production in advanced Korean-English and Farsi-English bilinguals, as compared to English monolinguals. More specifically, we used a word-reading task to compare the production of the single grapheme <m> (e.g. <stomach>) with the digraph <mm> (e.g. <summer>). An acoustic analysis of 600 tokens in Praat revealed that Korean-English bilinguals exhibited significantly longer [m:] compared to English monolinguals but that the Farsi-English bilinguals did not. Longer [m:] productions are attributed to orthography induced L1 transfer. These findings are discussed with respect to the potential modulating effect of language depth, L1 orthographic cues, and knowledge of Latinized alphabets in Korean. Taken together, our work suggests that L1 orthographic effects may persist in proficient bilinguals. We recommend that L2 speech learning be treated as a multi-modal event.

**Keywords:** L2 speech, reading, orthography, acoustic, Korean, Farsi, English

## Introduction

Recent studies have provided evidence for orthographic effects in both second language (L2) perception and production. These studies have demonstrated that orthographic input may interact with auditory input and may promote (e.g. Bassetti, Escudero, & Hayes-Harb, 2015; Erdener & Burnham, 2005; Rafat, 2015), hinder the target-like production (e.g. Bassetti, 2017; Bassetti et al., 2015; Erdener & Burnham, 2005; Nimz & Khattab, 2019; Rafat, 2015, 2016; Young-Scholten, 2002), correct perception of the target L2 sounds, or have no effect (Showalter & Hayes-Harb, 2015). Previous studies have suggested that orthography may affect L2 speech because of perceptual illusion (Rafat, 2015; Rafat & Stevenson, 2018) or transfer (Rafat, 2016). One of the ways in which orthography can affect L2 speech is by promoting L1-phonological transfer (Rafat, 2016; Young-Scholten, 2002). Although, the possibility of L1 induced orthographic transfer has been examined in languages with a Roman alphabet orthography (see Bassetti, 2017), not much is known about this phenomenon in languages with other scripts.

This paper has two main goals. First it examines whether orthographic input promotes L1 induced transfer leading to non-target-like second language (L2) productions in word reading in highly advanced Korean- and Farsi-English bilinguals. Second, it investigates whether there are L1-specific orthographic effects in L2 production. Korean and Farsi differ from English in terms of script, depth and some other characteristics. We will be examining the production of the digraph (two letters) <mm> (e.g. <summer> /sʌmɪl/) because although digraphs are produced as singletons in English, they are produced as geminates in both Korean and Farsi.

The study included a picture-naming/word-elicitation task, word-reading task and a C-Test (Raatz & Klein-Braley, 1981). The participants also had to complete a background questionnaire. In this paper, we will report the effect of the word-reading task and control for the effect of proficiency in the L2.

The research questions in the paper are as follows:

1. Does orthography affect L2 word-reading leading to non-target-like productions in highly proficient bilinguals?
2. Are there L1-specific orthographic effects in L2 production?

### ***Orthography-induced L1 phonological transfer***

There is considerable evidence that when the L1 and L2 grapheme-to-phoneme relationships are incongruent, exposure to orthographic input may result in L1-based phonetic or phonological transfer (e.g. Bassetti, 2017; Rafat, 2011, 2016; Young-Scholten, 2002). For example, highly proficient Italian-speaking learners of English produce digraphs (e.g. <kittt>) as long/geminate consonants with a significant difference between their CC vs. C productions in English (Bassetti, 2017). Other factors such as amount of exposure to the input (Young-Scholten, 2002), the degree of acoustic distance between the L1 and L2 sounds in the case of shared graphemes between the learners L1 and L2, position in the word and condition of training and testing have also been reported to control the rate of orthography-induced transfer in L2 production (e.g. Rafat, 2011, 2016).

### ***The effect of orthographic depth***

Orthographic depth refers to the degree of consistency between graphemes and sounds. Orthographic systems, where graphemes and phonemes have a one-to-one relationship, such as Italian and Spanish are considered shallow/transparent/regular, but orthographic systems that exhibit one-to-many grapheme-to-phoneme or many-to-one phoneme-to-grapheme relationships are called deep/opaque/irregular orthographies. The Dual Route Cascade Model of reading postulates that speakers of languages with shallow/transparent orthographies tend to be more affected by orthographic input than speakers of languages with deep/opaque orthographies (Coltheart, Rastle, Perry, Langdon, & Ziegler, 2001). However, the latter proposes that reliance on both the lexical and phonological pathways is not categorical. Given that there is some evidence to suggest that shallow and deep orthographies favor a differential degree of reliance on the phonological and lexical pathways, depending on the language-specific demands in learners (Buetler, de León Rodríguez, Laganaro, Müri, Nyffeler, Spierer, & Annoni, 2015), the effect of orthography may be more robust in L2 learners of languages, whose L1 is shallow in comparison with those whose L1 orthography is deep.

Erdener and Burnham (2005) found that although naive English-speaking listeners' production of target language sounds were positively affected by orthographic input, when exposed to a transparent language such as Spanish, this effect was more robust for Turkish-speaking listeners.

### ***English, Korean and Farsi orthographic systems***

The orthographic systems of English, Korean and Farsi vary with respect to script and the degree of orthographic depth. Whereas English is a Roman alphabetic system, the Korean orthographic system is a syllabary system, called Hangeul. Moreover, English is a deep orthographic system with one-to-many grapheme-to-sound or many-to-one sound-to-grapheme correspondences, but Hangeul is a transparent/shallow system. In the latter orthographic system, each character, or jamo, corresponds to a single phoneme. Jamo are arranged into blocks, which are equivalent to a single syllable. This system does not differ from English with respect to the direction of reading. The jamo that make the blocks are read from top left to bottom right. Korean also has three Romanized orthographic systems, namely Yale, McCune-Reischauer, and Revised Romanization, however, Korean speakers rarely use Romanized orthographic systems.

Farsi, on the other hand, like English is an alphabetic system, but it has a different script, namely one that has evolved from the Arabic script. In terms of depth, although the relationship between graphemes and sounds in Farsi tends to be a one-to-one relationship, most of the vowel diacritics are not cued in the orthographic system. These vowels are initially taught to children in primary school, but are not used in any other contexts. Therefore, Farsi like Arabic is considered a deep orthographic system. Farsi is read from right to left.

### ***Gemination in Farsi, Korean and English and their orthographic representation***

Length is contrastive in Farsi/Persian and affects all consonants (e.g. Rafat, 2010; Rafat, Mohaghegh, & Stevenson, 2017). For example, /æjar/ ‘carat’ contrasts with /æj:ar/ ‘brave’. Gemination is cued by a diacritic (ـ) (e.g. /hem:at/). However, the use of the diacritic is also variable as it is not obligatory. For example, /هَمَّت/ /hem:at/ ‘effort’ may also be written as //همت. Digraphs are also read as geminate sounds (e.g. کم مو /kam:u/ ‘fine haired’) in Farsi.

Geminates in Korean have been mostly discussed in the context of stops. The stop contrast in Korean is a three-way contrast in both place and manner; the labial, alveolar, and velar stops all have a “lenis”, “fortis” and aspirated version (see Table 1). Although the featural phonemic representation of stops is highly contested, some authors have argued that the fortis stops are geminate in nature. In intervocalic position, fortis stops are produced as a geminate lenis stop (see Ahn & Iverson, 2003, among many others). Gemination is also present in the Korean sonorants /m,n,r,l,s/ (e.g., 어마/ eoma / “oh my” vs. 엄마/ eomma / mom).

Obstruent geminates are represented in three different ways (as presented in Table 3) in Hangeul: a fortis stop in the coda position followed by a null consonant in the onset of the following syllable block (e.g. 밖에 /bagge/ “at the outside”), a fortis stop in the onset position following a syllable with no consonantal coda (e.g. *doggi*, *keuddae*, and *sabbun* in Table 2), or two identical stops – one in each of the coda and onset consonant positions (e.g. *eomma*, and *innae* in Table 2). In all obstruent stop geminates, there are two copies of the consonant used to represent the geminate, though they can appear either as one “double” jamo, or separately as two jamo. Geminates of obstruents are also represented as two repeated Latin characters in the three most popular romanization systems for Korean (Yale, McCune-Reischauer, and Revised Romanization). However, Korean speakers rarely use Romanized orthographic systems.

**Table 1. Minimal pairs for Korean intervocalic stops (Broselow & Park, 1995)**

	“double” <i>Jamo</i> in word-medial syllable onset	“double” <i>Jamo</i> in word-initial syllable coda	Two Jamos
ㄴ n	n/a	n/a	인내 /in.nae/ ‘perseverance’
ㄱ g	도끼 /dog.gi/ ‘axe’	밖에 /bag.ge/ ‘outside+LOC’	직기 /teig.gi/ ‘loom’

Whereas gemination is contrastive in Farsi and Korean, it is non-contrastive in English (e.g. Kaye, 2005). However, phonetic lengthening has been reported to occur in English when identical segments are realized at the morpheme or word boundary only (concatenated geminates such as nighttime and makes sense (e.g. Kaye, 2005).

### **Hypotheses**

The hypotheses in this study are as follows:

H1. Exposure to orthographic input during a word-reading task will lead to non-target-like L2 productions in highly proficient bilinguals.

H2. There will be L1-specific orthographic effects in L2 word-reading (Coltheart et al., 2001; Erdener & Burnham, 2005).

## Methodology

### Participants

There were three groups of participants: (1) Korean-English bilinguals (n= 25), (2) Farsi-English (n=25), and (3) native speakers of English (n=25). Both bilingual groups were born, raised, and completed high school in their countries of origin (i.e. Korea and Iran, respectively). All participants had been living in Canada for at least one year prior to the study.

### Tasks

The participants participated in two main tasks: (1) a picture-naming/word elicitation task and (2) a word-reading task. In the word-reading task, the participants read a list of words, their voices were recorded, and they were eye-tracked. The bilingual participants were also tested with a C-test for their proficiency in English and their native language (i.e. Korean or Farsi). All participants completed the Language Experience and Proficiency Questionnaire (LEAP-Q) (Marian, Blumenfeld, & Kaushanskaya, 2007) too. We will only focus on the word-reading task and the production data in this paper.

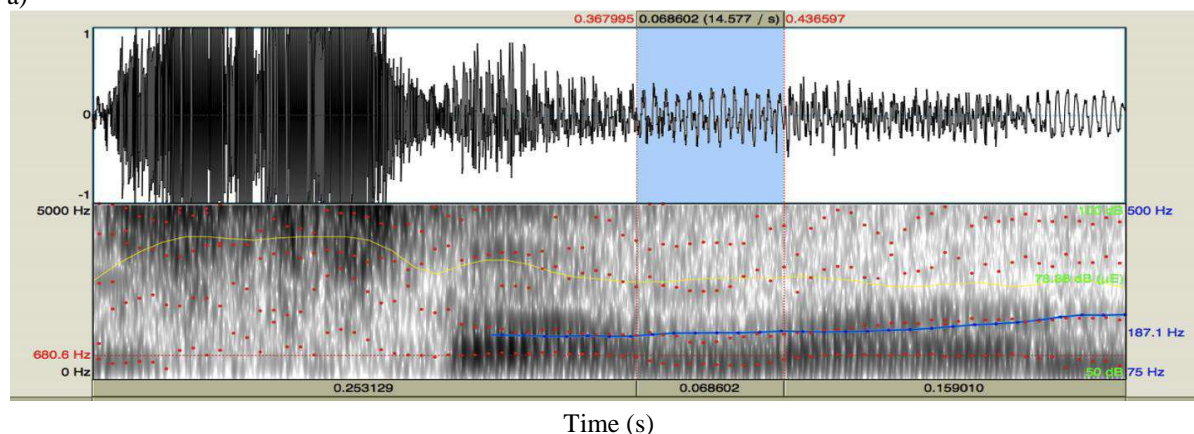
### Stimuli

Word pairs were generated to compare the production of English words with single graphemes or digraph in the inter-vocalic word-medial position. Five pairs of English words were generated for each of eight graphemes: <p, b, t, d, k, g, m, n, r, l> and their corresponding digraphs. All words were bisyllabic with stress on the initial syllable. This resulted in two lists of 40 words; one list contained words with a single target grapheme, and the other a target digraph. The vowels preceding the digraphs were lax vowel (i.e., /ɛ/, /ɪ/, /ʊ/, or /ə/). The log frequency of the list of words with a single grapheme and words with a digraph was controlled for using the SUBTLEXus database (Brysbaert & New, 2009). The two word lists were matched for word length. The words of both lists averaged 6 characters long. In this study, we will focus on a subset of the stimuli, namely the production of English words containing <m> vs. <mm> in the word-reading task.

## Data analysis and results

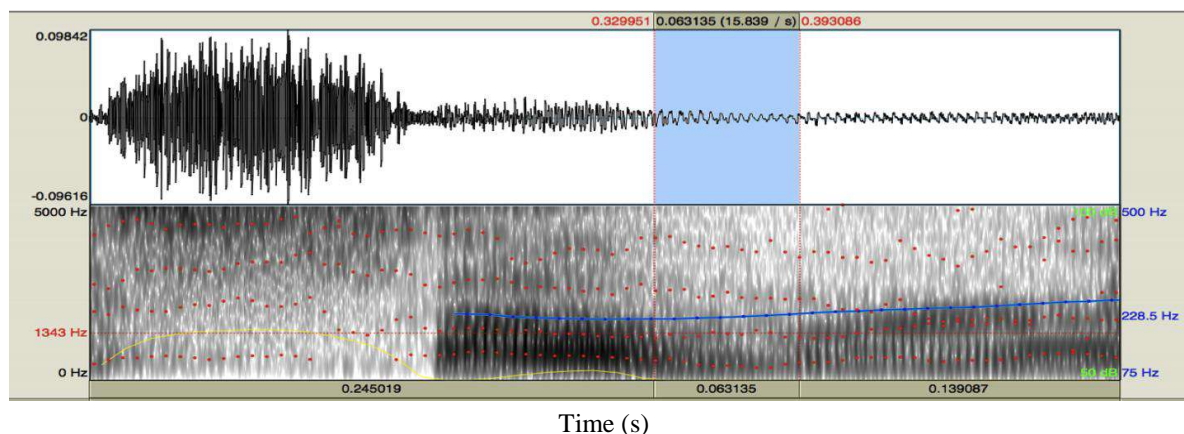
A total of 600 tokens were analyzed acoustically using Praat (Boersma & Weenink, 2012). We measured the duration of [m] and [m:] and their preceding vowels in the two words <summer> /sʌmə/ and <stomach> /stʌmək/ for all three groups. To analyze sound duration, speech waveforms and spectrograms were inspected in Praat. Figure 1 depicts the duration differences in the spectrograms for the English word <summer> /sʌmə/ across all three groups.

a)

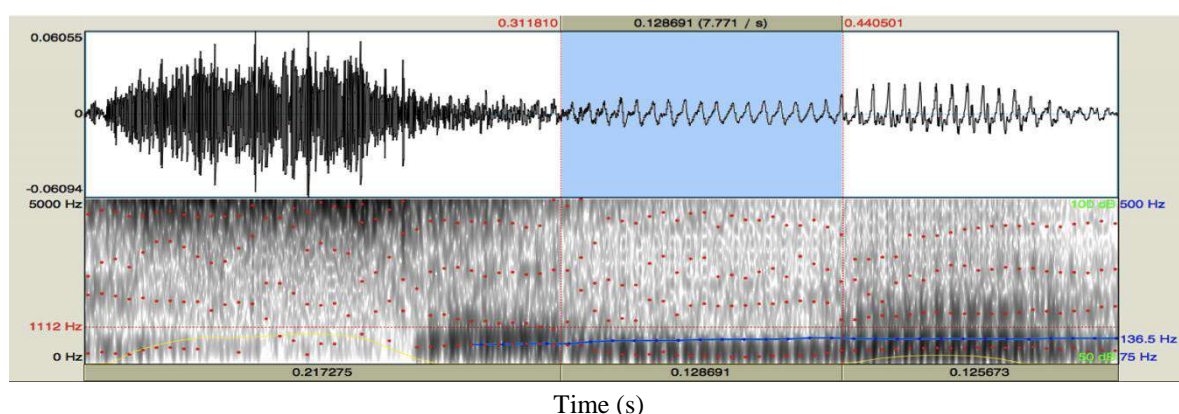




b)



c)



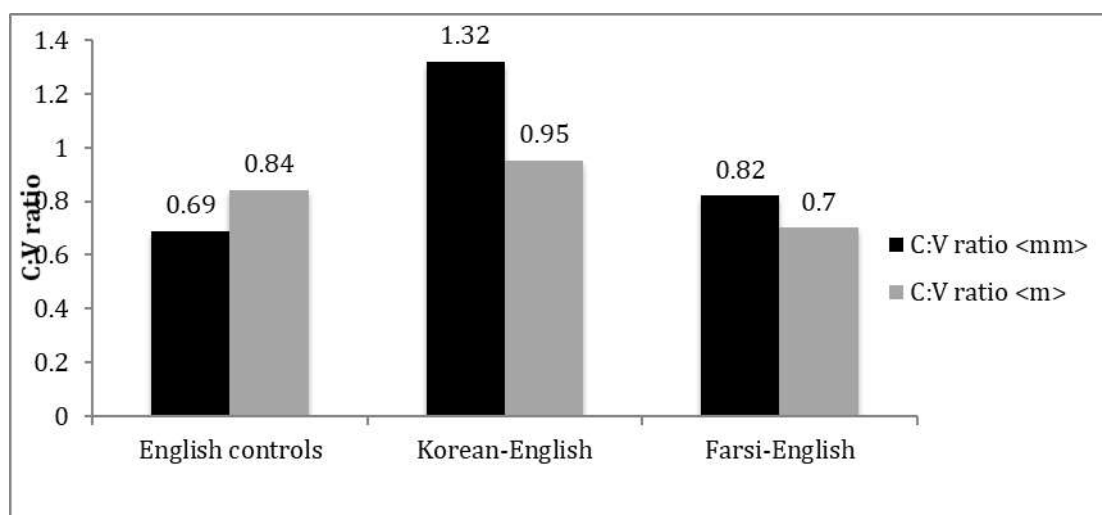
**Figure 1. Sample waveforms and spectrograms of the word <summer> /sʌm̩ə.ɹ/. The area highlighted area indicates the interval corresponding to the duration of <mm> in a token produced by a participant from: a) the English monolingual controls (69ms); b) the Farsi-English bilinguals (63ms); c) the Korean-English bilinguals (129ms)**

## Results

We ran linear mixed-effects models within the lme4 package of R (version 3.6.1) to analyze the data (Baayen, 2008; Baayen, Davidson, & Bates, 2008; Bates, Mächler, Bolker, & Walker, 2014; R Development Core Team, 2019). We ran two models: one for <mm> and one for <m>. Across both models, the fixed effect (i.e. variable of theoretical interest) was language group (Korean-English, Farsi-English, English monolingual). This variable was treatment coded, with English monolingual as the baseline. We included a control predictor (i.e. covariate): L2 age of acquisition (AoA). This variable was continuous and scaled (i.e. z-scored) to reduce collinearity. Finally, we included a random effect: random intercept for participants.

### <mm> model

We found that relative to English monolinguals, only Korean-English bilinguals showed a significant difference in reading <mm> ( $\beta = 0.45$ ,  $SE = 0.14$ ,  $t = 3.21$ ,  $p = .002$ ). More specifically, as Figure 2 demonstrates, Korean-English bilinguals had a higher geminate-singleton ratio than English monolinguals (1.32 vs. 0.82, respectively). In contrast, no significant differences were found for Farsi-English bilinguals and English monolinguals ( $\beta = -0.20$ ,  $SE = 0.15$ ,  $t = -1.35$ ,  $p = .18$ ; 0.69 vs. 0.82, respectively).



**Figure 2. C:V ratios for <mm> and <m> in the English words <summer> and <stomach> produced by English controls, Korean-English and Farsi-English bilinguals**

### *<m> model*

We found no significant language group differences in reading <m>. As Figure 2 demonstrates, Korean-English bilinguals and English monolinguals had comparable ratios ( $\square = 0.07$ ,  $SE = 0.12$ ,  $t = 0.58$ ,  $p = .56$ ;  $0.95$  vs.  $0.84$ , respectively), as did Farsi-English bilinguals and English monolinguals ( $\square = -0.21$ ,  $SE = 0.13$ ,  $t = -1.59$ ,  $p = .12$ ;  $0.70$  vs.  $0.84$ , respectively).

## Discussion

The first hypothesis in this study had predicted that exposure to orthographic input during a word-reading task would lead to non-target-like L2 productions in highly proficient bilinguals. The second hypothesis had predicted that there would be L1-specific orthographic effects. Both hypotheses were verified. Our results indicated that orthography did continue to exert an influence on the L2 speech production of the highly proficient participants in the word reading task, and this effect was language-specific.

It is difficult to say exactly why Korean learners exhibited longer/geminate [m:] for the digraph <mm> than the English controls, but Farsi speakers did not. One possibility is that <mm> is produced as [m:] in the Latinized alphabetic systems of Korean, and so the grapheme-to-sound correspondence is transferred when reading in English. However, Latinized alphabets are rarely used by Korean speakers in Korea, and they mainly serve to teach Korean to foreigners. Another reason could be that gemination is only cued by doubling a character or a feature of it in Korean, but in Farsi gemination is cued by a diacritic (ـ), although digraphs are also read as geminate consonants. However, because digraphs are read as geminates in Farsi, we would still expect Farsi speakers to read digraphs in English as geminates too. A third possibility is that the Hangeul orthographic system is shallow, but Farsi is deep. Therefore, the orthographic input exerted a more robust effect on Korean speakers than on Farsi speakers. That orthographic depth may determine the degree to which learners' speech may be affected by orthographic effects, as has been previously proposed by Erderner and Burnham (2005). Although we have seen English-speaking learners of other languages, such as Spanish, exhibit orthographic effects in their L2 speech, we are not aware of any previous studies that may have compared the effect of orthographic depth in L2 speech. Although we did not find an effect of orthography when the Farsi-English bilinguals were exposed to <mm> in English, we do think it is also possible for Farsi speakers to exhibit orthographic effects in other orthographic contexts. Future studies will need to explore the graphemes that might be more conducive to triggering an orthographic effect.

The findings in this study are also novel because of the language pairings. We have shown that orthography-induced transfer does take place when the L1 and the L2 orthographic systems differ in script (i.e. English and Korean). However, this claim has to be further examined, because our Korean participants may have had knowledge of the Latinized orthographic systems and have therefore been biscriptal.

Previously, Rafat (2015, 2016) and Rafat and Stevenson (2018) examined the effect of orthography in naïve-English speaking learners of Spanish and proposed that exposure to orthography may lead to the establishment of non-target-like L2 categories, as L2 speech learning is a multi-modal event. The current paper has provided evidence for non-target-like productions in L2 word reading. The claim that exposure to orthographic input may lead to non-target-like representations in highly advanced learners, will have to be further examined with a picture-naming task, where the learners are not exposed to any orthographic input.

## Conclusion

The findings in this study are important because they show that orthography continues to exert an influence in L2 word reading in highly advanced learners, albeit the effects are modulated by the idiosyncrasies of the L1 orthographic systems. As such, we contribute to the dearth of evidence on research on the effect of orthography on learners, whose L1 is a system other than the Roman alphabetic system. Future models of L2 speech learning will need to incorporate the effect of orthography and treat L2 speech learning as a multi-modal event.

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## **Characteristics of Japanese young children's word accent assignment when reading**

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**Abstract.** Recently, there has been an increased interest in the relationship between children's reading development and/or disorders and stress assignment in languages with orthographic transparency. However, not many studies have explored how pitch accent affects children's reading performance. Consequently, the purpose of the present study is to investigate the impact of pitch accent assignment rules on reading in Japanese, focusing specifically on the following points. First, whether Japanese-speaking children assign unmarked pitch accent when they can read words fluently. Second, whether they assign other marked accent when they cannot read words fluently (in other words, when they read them letter-by-letter). The participants were 25 children (aged 5;9 to 6;8). The stimuli were non-familiar words composed of five light syllables with the third syllable accented by the unmarked accent rule. The participants were asked to read each stimulus word aloud as fast as possible; those children who read the words letter-by-letter were asked to "do-it-again". The results were as follows. The results revealed that when words were read letter-by-letter, they were most frequently non-accented (51.8%), followed by a third-syllable accent pattern (27.3%); first- (2.7%), second- (1.8%), and fourth-syllable (16.4%) accent patterns were also observed. In contrast, the percentage of the third-syllable accented words (97.5%) was remarkably higher than that of the non-accented words (2.5%), when the children read the words fluently. Moreover, when words were read fluently in the do-it-again task, only two accent patterns were observed, the third-syllable accented being most used (71.4%), followed by the non-accent (18.6%). In conclusion, these results suggest that the development of reading fluency is closely related to the assignment of accent, which is triggered by the pitch accent assignment rule.

**Keywords:** accent, stress, reading, young children, fluency, Japanese

### **Introduction**

It is widely accepted that learning to read depends on phonological skills and that children who have phonological difficulties are at risk of having problems with reading (Carroll & Snowling, 2004). In addition, many studies of children at risk for dyslexia focusing on the development of phonological-processing skills revealed that they showed difficulties with phonology (Snowling, 2000). Therefore, to identify those who may have difficulty with reading as early as possible, it is crucial to investigate the reading development of preschool children, focusing on the phonological aspect.

Several researchers now argue that prosodic sensitivity is an important predictor of reading ability (Goswami, Gerson & Astruc, 2010; Leong, Hämäläinen, Soltész, & Goswami, 2011). Moreover, studies on dyslexia have investigated suprasegmental phonology or prosody (Anastasiou & Protopapas, 2015; Calet, Gutiérrez-Palma, Defior, & Jiménez-Fernández, 2019). In particular, various studies on languages with orthographic transparency have focused on the relationship between reading development and/or disorders and suprasegmental phonology.

Recent studies have examined the relationship between children's reading development and/or disorders and stress assignment in languages with transparent orthography, such as Spanish and Italian (Gutiérrez Palma & Palma Reyes, 2007; Paizi, Zoccolotti, & Burani, 2011). Developmental studies of languages with lexical stress — Spanish and Greek, for instance — showed that stress assignment depends on both lexical and sublexical information for stress placement (Paizi et al., 2011). In Spanish, stress sensitivity and knowledge of stress rules have been reported to affect reading performance and improve reading fluency (Gutiérrez Palma & Palma Reyes, 2007); in Greek, typically developing children were reported to apply a default metrical pattern (on the penultimate

syllable) to nonwords (Protopapas, Gerakaki, & Alexandri, 2006). It was thus concluded that stress assignment is an important and necessary step in reading aloud. However, there have been few studies of how pitch accent affects children's reading performance, and Japanese is a language with orthographic transparency and pitch accent.

The purpose of this study was to investigate how rules of pitch accent assignment affect reading in Japanese. It focused especially on whether Japanese children would assign an unmarked accent when they could read words fluently or another accent when they could not (i.e. in letter-by-letter reading).

## Method

### *Stimulus words*

Kondo and Amano (2001) reported that when non-words were used as stimuli, it was necessary to consider whether they maintained the phonological characteristics of Japanese. Thus, low-familiarity words were used as stimuli in this study. Six non-familiar words were selected. Their familiarity with stimulus words was less than 3.5 according to Amano and Kondo (1999). It is rated by -7point scale from 1 (low familiarity) to 7 (high familiarity).

Japanese has two types of lexical words: accented and unaccented (Kubozono & Ogawa, 2004). The Tokyo dialect comprises accented words, spoken with an abrupt pitch fall, and unaccented ones, pronounced with a flat pitch (Kubozono, 2006b). Most loanwords follow the *antepenultimate rule* that puts the accent on the third syllable, or mora, from the end of the word (Kubozono, 2006a), which applies not only to loanwords but also in the accentuation of native and Sino-Japanese terms (Kubozono, 2002); therefore, Japanese native speakers are able to assign accents to nonwords (Kubozono, 2006b). However, as Tanaka (2008) pointed out that unmarked accents vary according to the number of moras and syllable structure, the non-familiar stimulus words were composed of five light (L) syllables with the antepenultimate rule accenting the third syllable (Table 1). The stimuli were written in *hiragana*, a Japanese syllabary.

**Table 1. Stimulus words**

Non-familiar word	Accent pattern	Syllable structure
ka.ta.ho.to.ri	katahótori	LLLLL
ka.shi.ko.mo.chi	kashikómochi	LLLLL
ka.ra.ko.ro.mo	karakóromo	LLLLL
ka.wa.tsu.ku.ri	kawatsúkuri	LLLLL
ha.ko.ma.ku.ra	hakomákura	LLLLL
ma.ku.ra.me.shi	makurámeshi	LLLLL

NB. // indicates syllable boundaries

// indicates the position of abrupt pitch fall

### *Participants*

The participants were 25 children, aged from 5 (range 5;9 to 5;10) to 6 years old (range 6;0 to 6;8), capable of reading 16 kana characters one by one in the stimulus words. They were enrolled in a kindergarten and judged to be 'developing normally' by their teachers.

### *Procedure*

The children were tested individually in a room at their school. In the reading task, they were asked to read the stimulus words as fast as possible. If they read the words letter-by-letter, they were required

to repeat the task. The stimuli were presented in a randomized order. Responses were recorded using a digital audio recorder (PCM-A10, SONY).

### Data analysis

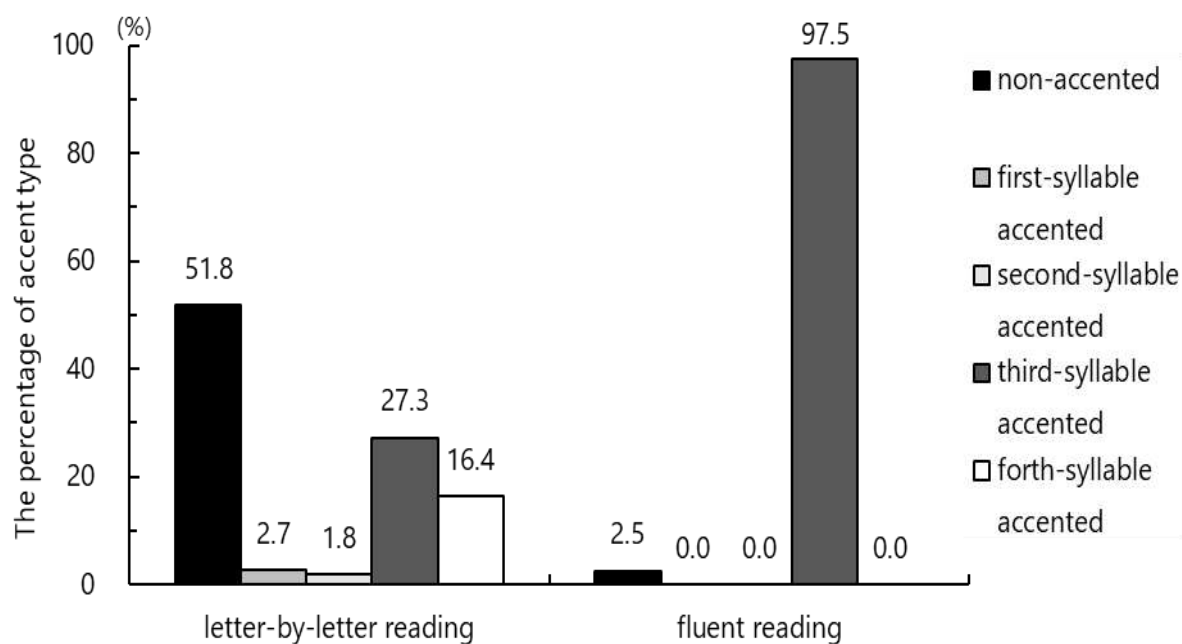
In Japanese, the relationship between orthography and phonology in the syllabary is perfectly regular and rule-governed (Sasanuma, Ito, Patterson, & Ito, 1996). Reading fluency rather than the number of errors is therefore expected to demonstrate reading difficulties and was the subject of analysis in this study. If a child read the stimuli without letter-by-letter reading, repetition, or revision, they were judged to be fluent.

Japanese *hiragana* provides a phonetic symbol for each mora, or unit of spoken Japanese roughly equivalent to one syllable. Consequently, letter-by-letter reading in Japanese actually refers to mora-by-mora reading: reading /sa...ku...ra/ 'a cherry tree' is considered letter-by-letter reading and /sakura/, fluent reading.

## Results

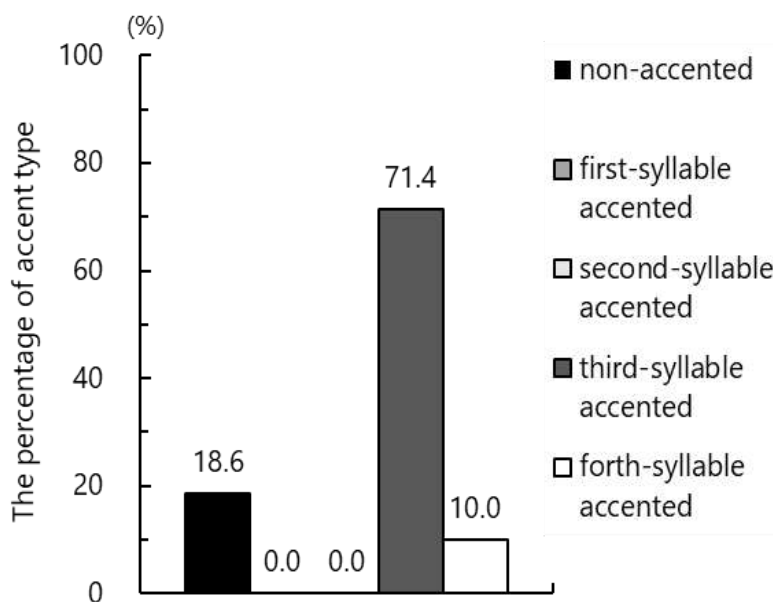
Five accent types were observed in the reading task: (1) a non-accented, low-high-high-high-high pitch, pattern (e.g. /kashikomochi/); (2) first-syllable accent, a high-low-low-low-low pitch pattern (e.g. /káshikomochi/); (3) second-syllable accent, or a low-high-low-low-low pitch pattern (e.g. /kashíkomochi/); (4) third-syllable accent, or a low-low-high-low-low pitch pattern (e.g. /kashikómochi/); (5) forth-syllable accent, or a low-low-low-high-low pitch pattern (e.g. /kashikomóchi/).

Figure 1 illustrates the percentage of accent types in letter-by-letter and fluent reading. The vertical axis shows the percentage of accent type, and the horizontal axis shows two types of reading: letter-by-letter vs. fluent. All types were observed in the former, with the most frequent being non-accented (51.8%), followed by third-syllable accent (27.3%). In contrast, only two types were observed in the latter, third-syllable accent (97.5%) being remarkably higher than non-accented (2.5%).



**Figure 1. The percentage of accent types in letter-by-letter and fluent reading**

Further, if the participants read the words letter-by-letter at the first trial, they were required to repeat the task. Figure 2 depicts the percentage of accent types used by those children who read the words fluently in the ‘do-it-again’ task. In the second fluent reading, third-syllable accent was once more the most frequent (71.4%), followed by non-accented (18.6%).



**Figure 2.** The percentage of accent types in fluent reading at the do-it-again task

## Discussion

This study aimed to examine the impact of pitch accent assignment rules on reading in Japanese. The accent assignment by children who could read words fluently was compared with those who read words letter-by-letter.

When words were read fluently, third-syllable accented words with an unmarked pitch accent were used remarkably more than non-accented ones, while other accent types were not observed. In contrast, the children who read words letter-by-letter, although all accent types were observed, used the non-accented type the most, followed by third-syllable accented. In addition, third-syllable accented was the accent type used most by those children who read fluently in the do-it-again task. These results reveal that children who can read fluently will assign an unmarked pitch accent, but those who cannot, will assign another accent type. Therefore, it is suggested that the development of reading fluency is closely related to accent assignment, which is governed by the pitch accent assignment rule.

Typically developing Greek children applied a default metrical pattern, accentuating the penultimate syllable, to nonwords (Protopapas et al., 2006). In Spanish, syllable structure affected stress assignment, according to a phonological rule (Gutiérrez Palma & Palma Reyes, 2004), and children proficient in reading and stress assignment displayed stress sensitivity (Gutiérrez Palma & Palma Reyes, 2007). The findings of this study with regard to Japanese are consistent with these results.

Letter-by-letter reading is shown in the early stage of reading in Japanese. The result of non-accented words being the most frequently used accent type in letter-by-letter reading raises the question of why no accent was applied to nonwords in the early stages of reading. It is possible that the high ratio of non-accented forms appearing in letter-by-letter reading is due to the failure of the child to recognize that it is a word. However, the exact mechanism of this non-accentedness needs further consideration. We leave this issue open here.



## Conclusion

In conclusion, findings from the reading tasks suggest that Japanese-speaking children assign unmarked pitch accents when they can read fluently, but assign other accents otherwise. To determine the role of accent assignment in reading more precisely, a comparison between the performance of older children with reading difficulties and those more proficient in reading is needed.

## Acknowledgment

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## Do listeners perceive morpho-syntactic elements of complex sentences when these are reduced by speakers?

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**Abstract.** The purpose of this study was to investigate the abilities of listeners of English to hear functional morphemes, given that functional morphemes are prone to modifications and reductions in spoken English. Using ‘third conditional sentences’ – a type of complex sentence which expresses the modality of past possibilities (e.g. We would have had better results, if we had had more participants in the study) – we set up listening tests in which listeners listened to such sentences and then reproduced them. Both first language (L1) and second language (L2) English listeners were tested. Findings showed that L1 listeners were able to reproduce the sentence structures accurately, although at times they produced what they, themselves, would say rather than what they actually heard. The L2 listeners in the study struggled to produce any of the third conditional structures accurately, despite having high levels of English proficiency. We then trained L2 listeners to notice the modal verbs and auxiliary verbs used in the third conditional structures and then re-tested them. Findings showed that perceptual awareness of reduced functional morphemes could be increased, which supports the claims that extended exposure to language features can help to facilitate representation entrenchment. Findings suggest thus that recognition of morpho-syntax in sentence processing can be developed in L2 listening.

**Keywords:** processing functional morphemes, morpho-syntax representation entrenchment, L2 listening, auditory attention, modality, processing third conditional sentences

### Introduction

#### *Background*

Listening in a second language (L2) can pose a number of challenges for individuals compared with listening in a first language (L1). Apart from the obvious challenge of unknown vocabulary and expressions, differing patterns of co-articulation and syllable stress can lead to difficulties with lexical segmentation and thus word recognition (e.g. Celce-Murcia, Brinton, & Goodwin, 1996; Fernandez & Smith Cairns, 2011; Field, 2003). This, in turn, can impact on the ability to notice the grammar of sentences.

Spoken English is especially prone to co-articulation where phonological segments overlap or are elided. As a result, many words are articulated differently in connected speech than in isolation, leading to word boundaries being more difficult to identify and thus to issues with lexical segmentation and word recognition for listeners (Field, 2003). Moreover, spoken English shows patterns of strongly stressed and weakly stressed syllables, where weakly stressed syllables are usually less audible, often with lower pitch, shorter duration and reduced vowels (e.g. Celce-Murcia et al., 1996; Fernandez & Smith Cairns, 2011). This makes weakly stressed syllables less salient and therefore less noticeable.

English sentences contain content words which carry semantic meaning and function words which help to determine who did what to whom and when. While most content words contain at least one strongly stressed syllable (Cutler & Butterfield, 1992), function words and functional morphemes (‘functors’) are often weakly stressed. Some function words are so weakly stressed that they become little more than a clitic attached to the preceding word, e.g. *they would* → *they’d*; *he had* → *he’d*; *we have* → *we’ve*; *we would have* → *we’d’ve*. As such, functors are quite often difficult to hear in spoken sentences.

When we want to talk about irrealis rather than actual events – for instance, possibility, probability, obligation, or necessity – we use modality. In English, modality is typically expressed through modal verbs followed by content verbs. When referring to the past, the auxiliary verb *have* is added, e.g. *would have*, *may have*. As such, modality in English is highly grammaticalised; however, this is not the same across all languages. In Russian, for example, the modal system is not as grammaticalised and modality is more a semantic category than a syntactic one (de Haan, 2002). Due to co-articulation and weakly stressed syllables, the articulation of modality is compromised in English in ways it may not be in other languages.

An issue that has been raised with regard to listening to an L2, is that listeners tend to over-rely on information from content words and under-rely on information from morphological aspects of syntax (see Andringa, Olsthoorn, van Beuningen, Schoonen, & Hulstijn, 2012; Clahsen & Felser, 2006a,b; DeKeyser, 2005; Field, 2003; Gor, 2015; Roussel, Gruson, & Galan, 2017).

Given the issues of co-articulation and weak stress, and the suggestion that L2 listeners under-rely on morpho-syntactic information, the purpose of this study was to examine the extent to which L2 listeners of English are aware of the modal and auxiliary verbs used in constructions of modality. Of particular interest are the types of complex sentence that include speculations about past events (referred to in language teaching as ‘third conditional’ sentences), for instance:

- *He would have passed the exam if he had worked harder.*
- *He wouldn't have failed the exam if he had worked harder.*
- *If we had included more participants in the study, the results would have been more robust.*

Third conditional sentences contain two clauses – the main clause which expresses an action/experience, and the ‘if’ clause with the condition that needs to be met for the main clause action/experience to occur. The reason speakers use third conditionals is to express that a certain action/experience did not occur because the condition (on which it depended) was not met. These sentences are challenging because the action is dependent on the condition, because of irrealis, and because of the reductions of the function words – the modal verb and auxiliary verb in the main clause (*would have*) and the auxiliary verb used in the ‘if’ clause to denote the past perfect tense (*had worked*, *had included*). We posit that the processing load of such sentences will work as an additional distractor from recognising the functors. Third conditional sentences were chosen for the study because, from a teaching perspective, their structure seems to be especially challenging for many L2 speakers even at advanced levels of proficiency.

### ***Aims***

The first aim of the study was to investigate the extent to which L2 listeners to English were able to hear and then reproduce third conditional sentences accurately. If L2 listeners demonstrated a deficit in the task compared to L1 listeners, the second aim was to investigate whether improvements could be effected through training to recognise the reduced functors. The overall aim was to explore whether an under-reliance on processing morpho-syntax could, in part, be linked to a deficit in functor recognition. In other words, if listeners were better able to recognise function words, would this lead to an improved ability to utilise complex grammar?

### ***Overview of the study***

The study was divided into three stages: In Stage 1, we worked with four L2 participants administering the pre-test, the training, and the post-test to benchmark the study. In Stage 2, we presented the pre-test and post-test sentences to a group of twenty-six L1 participants so that comparisons could be made between L1 and L2 speakers. In Stage 3, we developed the training and trained ten further L2 participants.

Research by Lieven and Tomasello (2008) shows that the properties of the input can drive the morpho-syntactic acquisition process; and on-going exposure can result in the input becoming routinized and automated through representation entrenchment (Schmid, 2007; and see also Deng, Dunlap & Chen, 2017). The underlying basis of the training was that extended exposure to, and

repetition of, input would aid both recognition of functors and help facilitate entrenchment of third conditional sentence structures.

## Design of the study

### *Materials for the tests*

The pre- and post-test materials comprised a number of third conditional sentences randomly mixed with a range of individual sentences of differing types and lengths to divert attention from the third conditionals. i. – v. below represent diversion sentences, vi. and vii. represent two of the third conditional sentences. There were 78 sentences in total, all relating to events in the past, of which 31 (roughly 40%) were third conditionals.

- i. You have only visited me once
- ii. Where have you put my keys?
- iii. Where did she say she had met her husband?
- iv. They asked whether she had always lived there
- v. This should have been investigated, but we didn't have time.
- vi. If he had read the book first, he would not have enjoyed the film
- vii. I would have helped you, if I had known you needed help.

The sentences were spoken aloud by a female, adult, L1 English speaker from the south-east of England with a fairly standard accent, and recorded. They included co-articulation and elision that would be usual for an L1 speaker.

### *Materials for the training*

The training materials comprised recordings of spoken sentences and matching written sentences, which participants could shadow-read. In total, there were 15 sheets of written sentences, with each sheet comprising 18 sentences. The sentences mainly related to events in the past, and included a number of third conditional sentences. The training sentences also included the modifications and elisions of co-articulation that are naturally occurring in spoken English, and they were read aloud by seven different adult L1 speakers.

In order to avoid a priming effect, the sentences used in the training had different content from those used in the pre- and post-tests. The materials were original, created by the researcher, and included a story to motivate participants to carry on with the listening sessions. Example sentences are:

1. "How different my life might have been if my birth parents hadn't died", Wellie thought to himself.
2. But he also thought about how good his life had been with his foster family, who had cared for him and given him an interesting life.
3. If his foster parents hadn't encouraged and supported him, he might not have gone to university nor completed his doctorate in anthropology.
4. But then, he would have missed out on the fantastic experiences he had had in the last few years of field work in Madagascar.

The training materials aimed to expose listeners to relevant aspects of co-articulation in a number of different contexts. Shadow reading aimed further to benefit listeners through providing sound-sight recognition of functors. Thus, the aim was to provide extended exposure to the relevant input to help facilitate the effects of entrenched representations.

## Methodology

### *Participants and procedure for the first stage*

Four L2 English speakers took part in the first stage of the study. Their profiles are shown in Table 1.

**Table 1. The four case-study participants in Stage 1**

First lang.	Age group	Gender	Age started learning English	Time in UK	English language level
Russian	36 - 45	male	10 years	9 years	CEFR C2 (low)
Russian	26 - 35	female	11 years	5 years	CEFR C2 (low)
Russian	36 - 45	male	12 years	5 years	CEFR C2 (low)
Portuguese	36 - 45	female	12 years	18 months	CEFR C1 (low)

The *pre-test* was administered before the onset of the training programme. Participants were asked to listen to sentences and to reproduce these in writing using pen and paper. They were made aware that: they would only hear each sentence once but they would not be put under time pressure as the next sentence would not be played until they had finished writing the current one; they could ask for a break at any time if required; they could write the functional morphemes in full or as reductions; spelling was not an issue as long as the words and morphemes could be understood. A short ‘chat break’ of two minutes was held after the first 20 sentences to avoid mental fatigue or loss of attention. In the pre-test, 33 of the 78 sentences were presented (the remaining 45 were presented in the post-test). Roughly just under 40% of the sentences in the pre-test and just over 40% in the post-test were third conditionals.

*Training* took place once per week for ten weeks. Each session lasted an hour, and the participants were trained together as one group. In each training session: First, participants listened to a set of 18 sentences. The sentences were played right through for listening comprehension. Participants could ask for a sentence to be played again to check vocabulary. After the first listening, the participants were given the printed sheet to shadow-read the sentences while they listened again. This time the focus was on word and morpheme recognition. Sentences that posed difficulties were repeated. The participants were encouraged to ask about any meanings that were unclear to them. The sentences were then played twice more and the participants could choose whether to shadow-read or merely to listen. Grammar training was not given explicitly, apart from a 30-minute reminder of the structure and meaning of third conditionals at the beginning of the training programme. None of the sentences from the pre- and post-tests were used in the training sessions. Each sheet was played at least once more in one of the subsequent sessions.

The *post-test* was administered in a separate session after the training sessions. The procedure was the same as for the pre-test.

Unfortunately, one participant had to withdraw from the study on health grounds before taking the post-test.

#### ***Participants and procedure for the second stage:***

Twenty-six L1 English speakers took part in the second stage of the study. 1 male, 25 females; average age group: 18-21.

The participants were tested in groups of various sizes, depending on availability. All 78 sentences were administered in a single test session of 60 minutes. The procedure was similar to that of Stage 1 case study participants except that all the sentences were given in one session.

#### ***Participants and procedure for the third stage***

Ten L2 English speakers took part in the third stage. Their profiles are shown in Table 2. The procedure was the same for these participants as for the Stage 1 participants, with four exceptions: 1. Some of the sentences were moved from the pre-test to the post-test and vice versa, with third conditionals comprising around 40% of the sentences in the pre-test and around 50% of the sentences in the post-test – thus with a slightly increased complex sentence load in the post-test. 2. Training took place individually. 3. During training, participants were asked to repeat some of the sentences aloud in

each session to practice producing the co-articulated sounds. 4. There were 6 training sessions of 90 minutes each.

**Table 2. The ten case-study participants in Stage 3**

First lang.	Age group	Gender	Age started learning English	Time in UK	English language level
Creole	8 months	F	1 year	8 months	CEFR C2 (low)
Chinese	6 months	F	12 years	6 months	CEFR C1
Arabic	5 years	M	11 years	5 years	CEFR C1
Japanese	2 months	F	13 years	2 months	CEFR B2 (high)
Arabic	6 weeks	F	5 years	6 weeks	CEFR B2 (high)
Thai	3 months	F	5 years	3 months	CEFR B2 (high)
Arabic	1 year	M	13 years	1 year	CEFR B2 (high)
Arabic	11 months	M	mid 20s in the USA (and very little at school)	11 months	CEFR B2 (high)
Korean	1 year	M	a year ago (and a little at school)	1 year	CEFR B2 (high)
Thai	3 months	M	7 years	3 months	CEFR B2 (high)

## Results

The differences between accuracy rates for the third conditional sentences used in the pre-test and those used in the post-test are shown below in Tables 3 and 4. Repeated measures T-tests were used in SPSS to analyse the significance of the results.

**Table 3. Results for Stage 1 and Stage 2 participants. Results given in %**

First lang.	Pre-test: correct third conditional structures	Post-test: correct third conditional structures	Correct 3 <sup>rd</sup> conditional structures: Difference between pre-test and post-test
Russian	25.0	-	-
Russian	16.7	55.0	+ 38.3
Russian	0.0	40.0	+ 40.0
Portuguese	0.0	35.0	+ 35.0
Stage 1 L2 mean* N = 3	5.6 (SD 9.64 / SEM 5.56)	43.3 (SD 10.41 / SEM 6.01)	+ 37.7 (SD 2.54 / SEM 1.47) p = .002
L1 mean N = 26	82.5 (SD 18.66 / SEM 3.66)	82.0 (SD 16.65 / SEM 3.26)	- 0.5 (SD 9.9 / SEM 1.94) p = .777

\*L2 mean is calculated only for the three participants who completed both tests.

**Table 4. Results for Stage 3 participants. Results given in %**

First lang.	Pre-test: correct third conditional structures	Post-test: correct third conditional structures	Correct 3 <sup>rd</sup> conditional structures: Difference between pre-test and post-test
Creole	37.5	60.0	+ 22.5
Chinese	0.0	5.0	+ 5.0
Arabic	12.5	80.0	+ 67.5
Japanese	0.0	85.0	+ 85.0
Arabic	0.0	55.0	+ 55.0
Thai	0.0	30.0	+ 30.0
Arabic	0.0	25.0	+ 25.0
Arabic	0.0	30.0	+ 30.0
Korean	0.0	20.0	+ 20.0
Thai	6.2	15.0	+ 8.8
Stage 3 L2 mean N = 10	5.6 (SD 11.95 / SEM 3.78)	40.5 (SD 27.74 / SEM 8.77)	+ 34.9 (SD 25.98 / SEM 8.22) p = .002
Stage 1 & 3 L2 mean N = 13	5.6 (SD 11.07 / SEM 3.07)	41.1 (SD 27.43 / SEM 6.77)	+ 35.5 (SD 56.98 / SEM 6.25) p = .000

## Discussion

1. **L1 listeners.** Although the majority of the L1 listeners produced most of the third conditional structures as standard, most listeners also produced some of their sentences with non-standard structures, e.g.

- i. *Would you have read the book if I **would have** lent it to you?*
- ii. *Would you have read the book if I **had have** lent it to you?*

instead of the standard, *Would you have read the book if I **had** lent it to you?*

Since these two non-standard structures have recently started to be used in British English, and clearly the listeners understood the meaning of the sentences, the non-standard versions were accepted as correct. Nevertheless, this demonstrates that in reproducing the surface form of the particular sentences, the L1 listeners were producing what they would say rather than what they heard.

Although we accepted these non-standard structures, we did not accept the past simple tense instead of the past perfect in the ‘if’ clause. The past perfect tense is used to signify that an action/event took place before another action/event in the past (e.g. *I **had completed** all my marking before I went out*). Although, in other types of sentence it may not matter if the past simple is used instead of the past perfect, in third conditional sentences it can lead to ambiguity, since the past simple is typically used in second conditional sentences which refer to situations/events in the present or future (e.g. *I **would not go** to school if it **snowed** tomorrow*). The use of the past simple in the ‘if’ clause was the main form of error – without this, accuracy rates for the L1 participants would have approached 100%.

2. **L2 listeners.** The pre-test and post-test results show that all 13 of the L2 listeners improved in their accuracy after training. The mean increases for Stage 1 and Stage 3 L2 groups were similar: means for each group separately were 37.7% and 34.9%, and 35.5% for both groups together, with all three mean differences being significant ( $p = .002$ ,  $.002$  and  $.000$  respectively). However, the participants were only tested once post training, and we cannot know therefore whether the effect of training was long term. Moreover, improvement rates varied greatly between participants, which indicates that



further investigation and a more systematic analysis is warranted. Nevertheless, the results provide some evidence that training can have a positive effect on L2 listeners' abilities to attend to the morpho-syntax of sentences.

3. Comparison between **L2 and L1 listeners**. The results show that the L2 listeners struggled to hear and reproduce third conditional sentences in the pre-test, but that accuracy rates improved for each of them in the post-test. In fact, two of the 13 were able to reach near L1 levels at 80% and 85% accuracy following training. These two participants were in the second cohort of L2 participants who received individual training and whose training included practice in articulating relevant reduced morphemes. This might suggest that practise in noticing functional morphemes could be augmented through articulation practice.

## Conclusion

Overall, the results provide suggestive evidence to further the claims of Lieven and Tomasello (2008), Schmid (2007), and Deng et al. (2017) that extended exposure can help to entrench representations – in our case of sounds as functors and of the use of modal and auxiliary verb functors in third conditional structures.

Moreover, in respect of L2 listeners, the study suggests that perceptual awareness of reduced functional morphemes can be increased, leading to developments in recognising morpho-syntax in sentence processing. This may have implications for language teaching approaches. In respect of L1 listeners, there is some evidence that listeners may not always notice the surface form of sentences, and this may have implications when accurate reproduction of surface structures is needed, for instance in understanding speech errors in a clinical setting. Further research is needed to investigate both these findings more systematically.

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# **The initial learning of intonation patterns in a novel dialect of English by monolinguals and bilinguals: An unexpected monolingual advantage**

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**Abstract.** Seventeen monolinguals and 25 bilinguals from Canada were compared on their short-term learning of a novel accent of English following a brief initial exposure. The target accent is spoken in Sussex (SE England) and differs from the subjects' baseline in several ways. Among these, the intonation patterns of the Sussex accent include the presence of final rising pitch (uptalk) in declarative sentences. The experimental set-up comprised the recording of baseline utterances, training, and testing. The pitch contours in declarative sentences were inspected manually to record the presence of uptalk. Both groups of speakers imitated uptalk successfully; however, the bilinguals returned to baseline in the testing phase. While the monolinguals' uptalk rates also decreased significantly in the testing phase, they remained above their baseline. These results indicate that there may be a monolingual advantage in the learning of intonation.

**Keywords:** bilingualism, acquisition of intonation, monolingual advantage, phonetic/phonological learning, uptalk

## **Introduction**

The effects of bilingualism on cognition have been examined in both behavioural and neuroimaging studies, and the resulting picture is that bilingualism is particularly beneficial to cognitive development in childhood and in preventing the rate of cognitive decline in dementia in old age (Bialystok, Craik, & Luk, 2012). The bilingual advantage may also be maintained throughout adulthood and involve the skill of learning new languages or dialects (Cenoz, 2003). Young adult bilinguals were shown to be more successful than monolinguals of the same age in tasks involving the learning of new segmental properties in a novel dialect of English, including vocalic aspects (Kondratenko & Spinu, 2014) and consonantal aspects (Spinu, Hwang, & Lohmann, 2017). The positive effects of bilingualism have also been found for novel word acquisition (Kaushanskaya & Marian, 2009), and vowel space restructuring when learning novel accents (Kondratenko & Spinu, 2014). In a recent study, subjects learned vocabularies that differentiated words using foreign phonetic contrasts.

Bilinguals displayed an advantage over monolinguals in phonetic learning, an ability modulated by the universal difficulty of the specific contrast to be learned and the phonetic similarity between the target language and the learners' native language (Antoniou et al., 2015). Other studies with non-native contrasts (e.g., Tremblay & Sabourin, 2012) indicate that multilinguals and bilinguals have enhanced speech perception skills compared to monolinguals.

Spinu et al. (2017) compared the performance of monolinguals and bilinguals from Canada in a production experiment with two tasks: imitation and spontaneous reproduction of a novel foreign accent (Sussex English, spoken in SE England). The focus was on the acquisition of the glottal stop allophone of word-final stops, a distinguishing characteristic of the Sussex dialect. The results show a bilingual advantage, leading the authors to speculate that echoic memory strategies, possibly underlain by stronger subcortical encoding of sound in bilinguals (Krizman, Marian, Shook, Skoe, & Kraus, 2012), may facilitate the re-mapping between existing mental representations of sounds and existing articulatory command configurations. Crucially, this bilingual advantage was only present in

the condition requiring spontaneous reproduction of the novel accent. During the imitation phase, both groups performed equally in approximating native production.

One of the most prominent features of a language, prosody, remains understudied to date in the context of bilingual acquisition. In the current study we address this gap by examining the learning of a specific intonation pattern known as uptalk by Canadian monolinguals and bilinguals. We are not aware of any previous studies that have explicitly examined the bilingual advantage on intonation learning. This might be because L2 intonation learning is a complex phenomenon as it involves phonology, semantics and syntax (Colantoni, 2019). From a phonetic and phonological point of view, the study of intonation is also challenging because it involves aspects such as phonetic features (e.g. tonal alignment, scaling) and phonological features such as pitch accent distribution (Cole & Shacuck-Hufnagel, 2011), and tonal composition and boundary tone specification (D’Imperio, Cavone, & Petrone, 2014).

## Experiment

Our study is part of a larger-scale project initiated at Concordia University in Montreal, Canada. Speakers of various linguistic backgrounds were trained on three novel accents of English: Russian English, Sussex English, and South African English. The ultimate goal is to quantify “accentedness” acoustically (based on measurements of production data of monolinguals and bilinguals) and perceptually (based on future perception experiments in which native speakers assess the degree of accentedness of the recordings collected).

The current study focuses on the prosodic feature of uptalk in the Sussex English accent. Uptalk, present in some varieties of English, consists in ending declarative sentences with a rising-pitch intonation. While uptalk has been observed in Canadian English (Shokeir, 2008), it was only minimally present in the speech of our subjects. Examination of the various sentence types recorded revealed that this prosodic feature differed most from Canadian English – as reflected in the baseline pronunciation of our subjects – which served as motivation for the present study. Specifically, while uptalk was present in 83% of all declarative sentences in the speech of our Sussex English speaker, it was present in less than 10% of all declaratives in the Canadian baseline productions.

## Hypotheses

The existence of a bilingual advantage in novel language/dialect learning (Cenoz, 2003) leads us to hypothesize that:

Hypothesis 1. Bilinguals will exhibit more effective learning of the Sussex uptalk intonation pattern than monolinguals. Specifically, the increase in uptalk rates from baseline to the experimental phase will be larger than that of monolinguals.

Based on the assumption that direct imitation produces behaviour that temporarily exceeds actual competence (Barry, Heoquist, & Nolan, 1989) and previously observed behavior regarding segmental aspects of second dialect learning (Kondratenko & Spinu, 2014; Spinu et al., 2017), we also predict that:

Hypothesis 2a. The rates of uptalk in imitation will be closer to native Sussex production compared to the baseline and experimental phase in all groups.

Hypothesis 2b. There will be no significant differences in uptalk between monolinguals and bilinguals in sentence imitation.

## Stimuli

Our Sussex English data were produced by a male graduate student at Concordia University. The speaker was monolingual and raised in South East England (Sussex area), having moved to Canada (Montreal) at the beginning of his graduate studies. He was recorded in a quiet room on a laptop with an external microphone. The recordings were done using *Praat* (Boersma & Weenink, 2012). As we

were interested in both prosodic and segmental properties, our stimuli were constructed such that they included 15 different vowels in a bVt or pVt context (all real words of English). These words were embedded in short sentences that were read with various intonation patterns, as shown in (1). This resulted in a total number of 75 sentences (15 words x 5 intonation patterns). Figure 1 shows examples of uptalk in this speaker's production.

- (1) Introductory declarative: *Bought* is a verb.  
 Declarative: Z bought his books on sale.  
 Tag question: Z bought his books on sale, didn't he?  
 Yes/No question: Did Z buy his books on sale?  
 Exclamatory sentence: Z bought his books on sale!

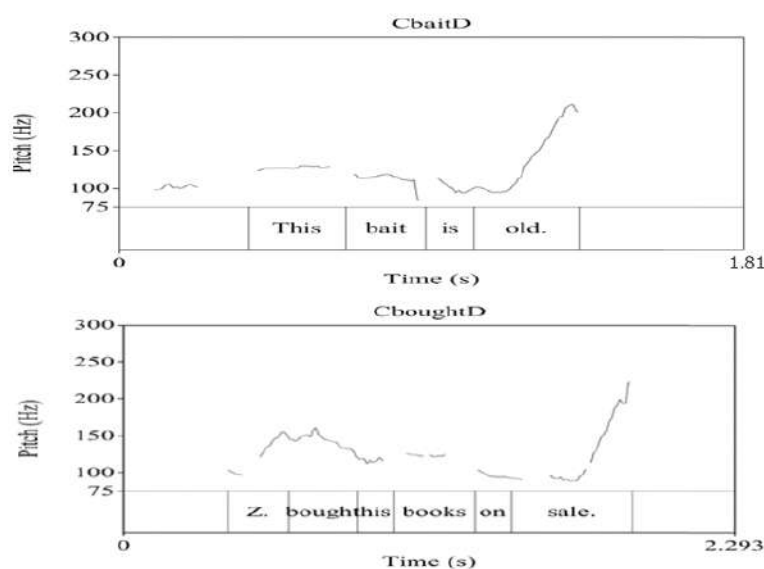


Figure 1. Pitch tracks for two declarative sentences spoken by the Sussex English native

### Participants

The participants were undergraduates at Concordia University (mean age 27). As compensation for taking part in the experiment, all participants received extra credit in linguistics classes. The following groups were identified post-experimentally:

Canadian English **monolinguals** (n=17, 13 F): 7 speakers raised in Quebec, 6 in Ontario, 3 in British Columbia, and 1 in Saskatchewan (see Spinu et al., 2017 for more details).

Quebec French-English (FE) early **bilinguals** (n=12, 7 F): all from Quebec (10 from Montreal).

English-‘Other’(EO) **bilinguals** (n=13, 12 F): speakers born in a country where they learned a different language (i.e., Ukrainian, Romanian, Hebrew, Greek, Italian, Lebanese Arabic, Punjabi, Swahili, Mauritian Creole) who moved to North America in their childhood (typically between 3-14 years) and also acquired English.

The two bilingual groups were treated separately because native language(s) are expected to play a part in L2/D2 learning ability (D’Imperio & German, 2015), and also because it was not clear whether the different degrees of bilingualism in the ‘Other’ group might cause substantial deviation from early bilinguals.

### Procedure

The experimental procedure consisted of the following stages:

1. Instructions and administration of a demographic questionnaire.
2. Baseline. The subjects recorded six sentences in their native accents, prior to exposure to the experimental accents. The sentences were all declarative but longer and more varied syntactically than the ones recorded by the native speaker. The vowels of interest were in a /hVt/ context.
3. Training. This stage consisted of two parts, a receptive one and a productive (imitative) one. The subjects first listened to the stimuli continuously for 5 minutes. They were then instructed to imitate each sentence one by one, immediately after listening to it. The presentation of the stimuli and associated recordings were done using the ModelTalker software (Yarrington, Gray, Pennington, Bunnell, Cornaglia, Lilley, Nagao, & Polikoff, 2008). The subjects had a practice session with 10 items to familiarize themselves with the procedure.
4. Post-Test. Each subject re-recorded the six sentences from the Baseline phase, trying to reproduce to the best of his or her ability the accent s/he had just been trained on.

Stages (3) and (4) were repeated three times in all, for each of the accents of interest. The Sussex English accent was the last accent presented to each subject. Each subject was tested individually in a soundproof booth and the entire experiment lasted about 90 minutes (approximately 25 minutes per accent).

### ***Analysis***

Only the declarative sentences were used. There were 15 sentences in Imitation, and the same six sentences in Baseline and Post. The total recorded was thus 1.134 (27 sentences x 42 subjects). One token was flawed due to a technical error, leaving 1.133 sentences for acoustic analysis. We manually inspected and classified the intonation contours of all declarative sentences from the Baseline, Post-Test and Training (Imitation) conditions as (a) rising final (i.e. uptalk present) or (b) non-rising final (i.e. uptalk not present). The categorization was first made based on the audio sample alone and then verified using spectrographic information. In all cases, the impressionistic judgments coincided with the information provided by the spectrograms (i.e. with a positive difference in pitch for the highest value in the last word of the sentence compared to the highest value in the word preceding it). While this difference varied continuously (in Hz), the robustness of the judgments suggests that the perception of uptalk may be of a categorical nature.

### **Results**

Figure 2 shows the mean uptalk for each group of speakers, broken down by experimental condition. Uptalk was relatively limited in the Baseline phase (9.9% on average), with somewhat higher values for the English-Other bilinguals (17.9%). During the Imitation phase, the percentage of uptalk increased above 75% for all groups. In the Post (or testing) phase, the percentage of uptalk returned to baseline results for the bilingual groups but remained significantly higher for monolinguals (17.6% compared to 3.9% in Baseline). A series of Fisher's exact tests compared the different conditions (Baseline, Imitation, and Post) for each speaker group. Imitation was significantly different from both the Baseline and Post phases for all speaker groups ( $p < .01$  across the board), but the Baseline results only differed significantly from the Post results in the case of monolinguals ( $p = .0008$ ). These results support Hypothesis 1 and Hypothesis 2a. To evaluate Hypothesis 2b, a second series of Fisher's tests was run to compare the speaker groups to each other during the Imitation phase; no significant differences were found.

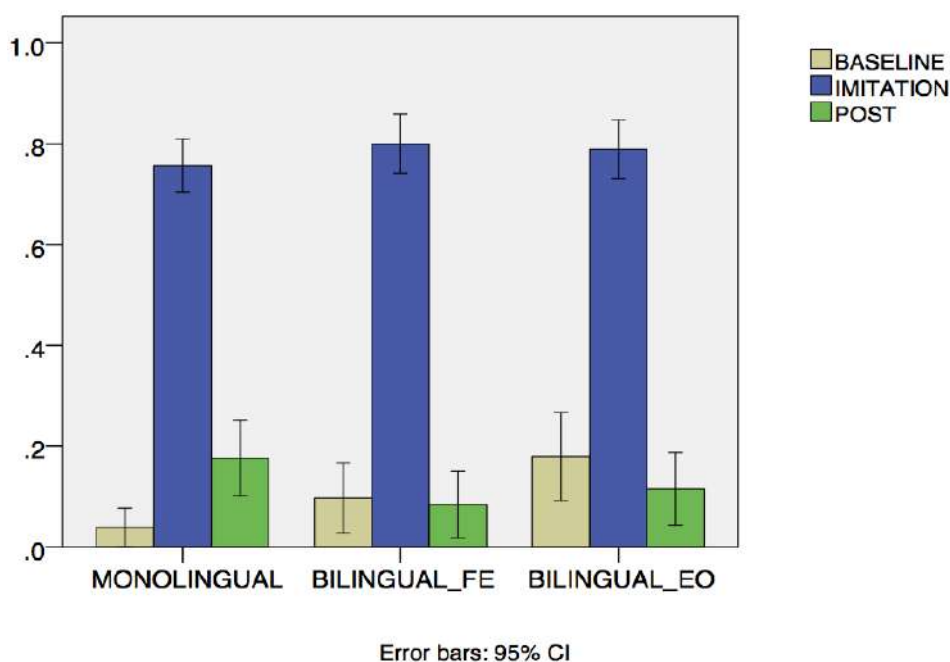


Figure 2. Mean uptake by group and condition (FE= French-English; EO = English-Other)

In Table 1, the mean uptake values for each group during the Imitation phase are broken down by sentence. One of the sentences, in which there was no uptake present in the Sussex input, serves as a potential control – it is indeed the case that none of the subjects produced it with a rising intonation, which confirms that they were paying attention to the task. The sentence “*This pot is beautiful*” is worth mentioning also, because of the reduced uptake rates across all speaker groups.

Table 1. Imitation: uptake proportion by sentence, in descending order of total score (FE= French-English; EO = English-Other)

SENTENCE	MONOLINGUAL	BILINGUAL_FE	BILINGUAL_EO
This boy is my friend.	0.94	1.00	1.00
This bait is old.	0.94	0.92	1.00
This boot is dirty.	0.94	1.00	0.92
This is about a boy.	0.88	0.92	1.00
This bet is off.	0.88	0.92	0.92
This bit is mine.	0.94	0.92	0.85
This buy is a good deal.	0.88	0.92	0.92
This beat is loud.	0.88	0.92	0.77
This boat is huge.	0.82	0.83	0.92
Z. bought his books on sale.	0.82	0.83	0.75
Z. put his books in a bag.	0.65	0.83	0.92
This butt is fat.	0.71	0.75	0.69
This bat is big.	0.71	0.75	0.62
<b>This pot is beautiful.</b>	<b>0.35</b>	<b>0.50</b>	<b>0.54</b>
This Bert, standing by the door, is my friend*.	0.00	0.00	0.00

\*NO UPTALK IN SUSSEX INPUT.

## Discussion

Our findings show a relatively small monolingual advantage in the short-term acquisition of prosodic patterns in a novel dialect. Hypothesis 2, describing the mechanism of speech imitation as both distinct from phonetic and phonological learning (2a) and equally feasible by monolinguals and bilinguals (2b), was fully supported by our data. The questions raised by these results concern the lack of a bilingual advantage, the unexpected presence of a monolingual advantage, and the role of imitation in L2/D2 learning.

The two bilingual groups we tested did not differ substantially in their behavior, just as they did not differ in the advantage displayed in learning novel segmental patterns (Spinu et al., 2017). A possible explanation for the lack of a bilingual advantage, and more generally for the limited presence of uptalk in the experimental phase across all speaker groups, may be related to the stigmatization of uptalk (Davis, 2010).

Another factor that may have played a part in the bilinguals' behavior is the presence of variability in the input. The Sussex English speaker, participating in the study, produced uptalk in only 83% of his declaratives. Both of the previous studies in which a bilingual advantage was found focused on aspects of speech that were realized 100% by the native speakers of the dialects on which the subjects were trained (e.g. the neutralization of the tense-lax distinction in high front vowels in Kondratenko and Spinu (2014) and the glottalization of word-final coronal stops in Spinu et al. (2017)). It is not clear why this would affect learning, considering the amount of variability present at all levels of speech, but the possibility arises that the subjects may have perceived uptalk as an optional rather than characteristic feature of the dialect they were learning. This brings up the notion of learning and the ways in which monolinguals and bilinguals may differ in their approach to language learning.

Turning to the monolingual advantage, if it is indeed the case that monolinguals pay more conscious attention in the learning process, this might explain our results. Since the uptalk pattern is defined by a pitch rise in the final part of the sentence, this may have triggered a recency effect (Vallar & Papagno, 1986). As a result, monolinguals were able to internalize the most consciously accessible (and thus salient) pattern.

Another potential factor supporting the monolingual advantage may have to do with linguistic background. Monolinguals may be more aware of, and sensitive to, prosodic variation in English, whereas the bilingual groups might experience transfer from their other languages. This may appear at odds with the Baseline distribution, in which monolinguals produced the least amount of uptalk (3.9%), while English-Other bilinguals produced uptalk in 17.9% of their sentences. While the reasons behind their initial increased uptalk rates are not clear (this group being too heterogeneous for generalization), this does not necessarily mean that they are more versed with English intonation. It may be the case that monolingual speakers 'hyper-articulated' at first, taking more care not to produce a pattern that they know is associated with a certain social stigma.

The role of imitation in language learning is not generally disputed. According to Markham (1997), acquisition itself is a strongly imitative phenomenon. Kuhl and Meltzoff (1995) discuss that imitation can result in nonidentical, but functionally equivalent reproductions of the modeled behavior (against the view that direct imitation bypasses all levels of linguistic processing), and this was indeed the case of monolinguals in the current study, who were able to generalize uptalk to novel sentences. On the other hand, the bilinguals' failure to regenerate uptalk shows imitation producing behaviour that temporarily exceeds actual competence (Barry et al., 1989). The fact that imitation of the sentences was much more successful than accent regeneration, and that there were no differences between monolinguals and bilinguals in the imitation task, suggests that imitation recruits different cognitive resources compared to those necessary for L2/D2 learning.

The most relevant question thus appears to be not whether imitation can facilitate learning for bilinguals versus monolinguals, but rather which aspects of learning are enhanced by imitation for each group.

## Conclusion



We have found that after a brief initial exposure and training on a novel accent of English, monolinguals outperformed bilinguals in the learning of a prosodic characteristic of the new dialect, that is, the realization of declarative sentences with final rising intonation (uptalk). This conclusion cannot be taken for granted, however, given the overall limited production of uptalk, which we have tentatively ascribed to task difficulty and/or the social stigma associated with this speech pattern. Nevertheless, our results suggest that there is at least one aspect of second dialect learning in which bilinguals are not more effective learners than monolinguals, and that a monolingual advantage in L2/D2 acquisition may also be at work as far as prosodic properties are concerned. Because of such findings, it is important for future studies investigating the learning of novel linguistic patterns to control for bilingualism in their subjects. A secondary result was that, while imitation facilitates short-term phonetic/phonological learning, it can also produce behaviour with little “carry-over into the post-imitative tasks” (Barry et al., 1989). Our results add empirical evidence to the body of work on bilingual and monolingual cognition and help gain more insight into the mechanisms underlying phonetic and phonological learning.

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## Is there a Midway Always? SPR evidence for the absence of partial selective access in Hindi-English bilinguals

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**Abstract.** Most of the research in bilingual activation favours non-selective access in both primed and non-primed conditions. The purpose of this study was to investigate the partial selective access in Hindi-English bilinguals. The present research investigated partial selective access using code switched constructions as stimuli in the experiments. It is evident that during code switching both languages are activated, but what matters is the bilingual's choice even after getting probed towards one or the other context. The presence of partial selective access needs to be examined in different contexts; hence this study also incorporates social factors. Two experiments are conducted in this study. The first experiment was sentence completion in which the participants were primed using a paragraph in a monolingual context. The second experiment was a self-paced reading paradigm. It aimed at checking the processing between code switched and non-code switched constructions, followed by a comprehension question as a filter. Mean reaction time differences point out that the non-code switched constructions (cncs and wncs) with dual context has a faster processing rate at the critical region as compared to the code switched constructions (ccs and wcs), supporting non selective access. This study and its finding are relevant, as it focuses and discusses the question why partial selective access is not ubiquitous.

**Keywords:** bilingualism, bilingual language control, partial selective access, non-selective access, Hindi-English bilinguals, self-paced reading

### Introduction

Controlling two languages and using them at different situations demands high cognitive control. (Beauvillain & Grainger, 1987; Grainger, 1993; Kroll and de Groot, 1993; Costa & Santesteban, 2004). Bilinguals have more flexible cognitive control as they handle two or more languages at a time (during code switching) than monolinguals. We have strong evidences regarding this stronger cognitive flexibility in bilinguals through linguistic and non-linguistic tasks. This control over languages during production and comprehension is mostly termed as inhibitory control, various inhibitory control mechanisms are employed to keep a check on the activation of different languages while delivering a task. The language choice of bilinguals is strategic in the sense that they have language selective and language non-selective access. Both selective and non-selective access is related to bilingual lexical access, it becomes slightly complex when the role of bilingual lexical access is determined at the level of comprehension. Grosjean & Li (2012) successfully established the parallel activation of languages in the bilingual memory. However, considering the organization of languages in the bilingual memory the level of activation needs to be specified. Recently, Hoversten and Traxler (2018) suggested that target and non-target languages may be active at different degrees, i.e. the selectivity of languages is partial, and it mostly depends on the mode presented to the bilingual. The inclination towards a particular mode is directly proportional to language selectivity. This study investigated Hoversten and Traxler's (2018) proposal of the presence of partial selective access by conducting experiments in the sentence completion and self-paced reading paradigm.

### *Bilingual lexical access during comprehension: Selective versus non-selective access*

During online comprehension and production bilinguals engage in the activation of both the languages. Most research findings favour non selective activation of languages which means that all lexical competitors (phonological, orthographical, and semantic) will be activated and stored in a particular lexical store. The output is a matter of choice of the bilingual. The degree to which

activation exists has also been a focus of research (Grosjean, 1998, 2001; Kroll & de Groot, 2011). Non selective access is mostly investigated experimentally with the use of lexical items, cognates, interlingual homographs, etc. The use of such items as stimuli is dubious as they are similar orthographically, phonologically and in other dimensions, which are likely to activate the lexical items of the other language. This effect is termed as the facilitation effect which is again consistent with the non selective view of language activation. The models that support facilitation and interference effects are the BIA and BIA+ models (Dijkstra & Van Hueven, 2002). However, there is less empirical evidence favouring language selective access which refers only to the activation of meaning of a particular lexical item in the target language. Most, if not all, research in bilingualism favours bilingual non selective access. An intriguing question is whether the level of activation depends upon the role of context or not. Some of the work by Libben and Titone (2009), Schwartz and Kroll (2006); Van Assche, Duyck, and Hartsuiker (2011), and van Hell and de Groot (2008) has investigated bilingual lexical access in more naturalistic contexts. Giving a naturalistic tinge to the stimuli involves appointing sentences as stimuli. Comprehending sentences involves more complexities; some researchers have also investigated cognate facilitation in sentence contexts. The present study employs code switches in sentential contexts to examine the level of activation, especially to check the presence of partial selective access.

### ***Partial selective access***

Words don't generally occur in isolation in the real world, and they rely on context. In a larger context, it is how bilingual language control and how models of bilingual language control come into action that need to be understood. With regard to context, there are still some major issues that have not been resolved yet.

- The effects of sentence context during reading are still unclear.
- The level of activation of the target and non-target languages has not been discussed; they may be active to different degrees or level.
- Surrounding context can have some influence on the activation of languages.
- Language mode (bilingual or monolingual) may affect the selectivity of language.

For instance, reading in a single language (monolingual mode) may demand more selectivity. These issues can be investigated by focussing on bottom-up and top-down control during reading, considering issues like degree of activation of each language, the time course of activation of each language, and the role of language mode.

Partial selective access is a proposal by Hoversten and Traxler (2018) that considers the level of activation of two languages during reading. They conducted two eye-tracking experiments with 60 Spanish-English college undergraduates at UC Davis. The participants were exposed to one language in each of two halves of the experiment; this was done to put the participants in monolingual mode. Each half of the experiment was instructed by a different experimenter. The task was simply to read sentences and then answer questions that were asked following ca. 20% of the sentences. Single word code switches were used as a probe for non-target language activation. The code switched words were then compared to the translations of the same word 'NS' and the pseudo words 'PW' to assess the degree of activation of each language. In order to investigate the time course of access to words in each language, eye movement measures reflecting the different stages of processing were analysed. The prediction based on the non-selective access was that code switches would be equally accessible as the non code switches. Based on selective access, code switches would be equal to the pseudo words. Going with the partial selective access skipping rate for non-code switched should be maximum followed by the code-switched and the minimum should be for the pseudo-word. The results of this experiment show that there are different degrees of accessibility of the base and alternate languages. Since the earlier stages of word recognition, the results assert the presence of partial selective access. It was also observed that the dynamic adjustments in the degree of accessibility of each language were based on the changing course of the context throughout the experiment. The authors propose that in different modes, i.e. monolingual and bilingual, the degree of activation of base and alternate languages is different. In such dual contexts, non-selective and partial

selective access can be favoured. The present study investigates the ubiquity of partial selective access in Indian contexts through two different experiments in different paradigms.

## Methodology

Similarly to Hoversten and Traxler (2018) who suggested that target and non-target languages may be active at different degrees, we propose that the inclination towards a particular mode, i.e. bilingual or monolingual, depends upon some contexts, these being social or psychological. So, in the conducted experiment, we contextually primed the participants using different lexical culture cues in order to check the influence of priming.

### Experiment 1

Sentence Completion (Items : N= 20, Fillers: N=15).

Thirty (30) Hindi-English bilinguals (N=30, mean age= 19.46, SD = 1.85) were given a paragraph each in Hindi and English in monolingual mode. Proper nouns in Hindi paragraphs were English words to probe for non-target language activation. Similarly, proper nouns in English paragraphs were Hindi words. Instructions to participants were also given in code mixed sentences. The task was to answer a question related to the context of the paragraph, using given options. There were five options: Correct code switched (ccs), correct non code switched (cncs), wrong code switched (wcs), wrong non code switched (wncs), and alternate non code switched (altncs). The reaction time of the responses was recorded and analysed in IBM Statistics SPSS 25. We found that by priming bilinguals with proper names in a different context, there is a change in their responses. Even in monolingual contexts, code switching is common.

Example:

अब सुबह का इंतज़ार करने के अलावा एलिज़ाबेथ के पास और कोई चारा नहीं था। जैसे जैसे रात गुज़रती जा रही थी उसका डर भी बढ़ता जा रहा था। उसे घबराहट हो रही थी की कब उसका बेटा जॉन घर वापस आएगा। जॉन कल शाम से ही घर वापस नहीं लौटा है, वह कल अपने दोस्तों के साथ मैकडोनाल्ड्स में पार्टी मनाने गया था। एलिज़ाबेथ अकेली अपने बेटे को ढूँढने नहीं जा सकती थी, उसने पुलिस को खबर कर दी थी।

**(Stimulus in English: Elizabeth had no other option except waiting for the morning. As the night went by, her fear also increased. She was worried for her son John and was waiting for him to come back. John did not return home. He went with his friends to a party at McDonalds. Elizabeth couldn't go by herself to find her son, so she informed the nearest police station.)**

जॉन कल ----- से ही घर के बाहर है।

**(John has not returned home since .....)**

- (1) इवनिंग (ccs) [Evening written in Devanagri script]
- (2) आफ्टरनून (wcs) [Afternoon written in Devanagri script]
- (3) शाम (ncs) [Evening]
- (4) दोपहर (wncs) [Afternoon]
- (5) सांझ@altncs [Alternative for evening in Hindi]

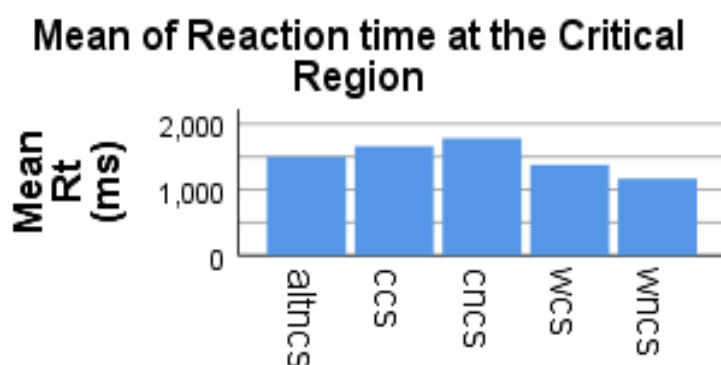
## Results

We examined the reaction time at the critical region in order to know the level of activation after priming the participants using proper nouns as probe. We found that the correct non code switched sentences took more time when compared to the remaining options. This shows that priming of context does have an effect on the accessibility, selectivity and choice of the bilinguals. The role of

the alternate non code switched (altncs) was to make the participant stay at the non code switched construction but, in spite of this compelling situation, the participant focussed more on the correct code switched situation. Table 1 and Figure 1 represent the mean reaction time in milliseconds (ms) for all conditions.

**Table 1. The Reaction time in milliseconds (ms) for all the conditions**

	Reaction time (ms)		
	Mean	SD	Variance
altncs	1499	1698	2883490
ccs	1660	1549	2400815
cncs	1779	1525	2325959
wcs	1378	1524	2323706
wncs	1168	1519	2308629



**Figure 1. A bar graph showing the mean of reaction time at critical region for all the conditions**

## **Experiment 2**

### *Self-paced reading paradigm*

Thirty (30) Hindi-English bilinguals (N= 30, mean age = 25.71 SD = 5.27) participated in the experiment. In this experiment, we checked the processing between code switched and non code switched constructions, followed by a comprehension question as a filter. Mean reaction time differences are noticed. It has been observed that the code switched constructions with dual context has a faster processing rate at the critical region as compared to the non code switched constructions. We analyzed the reaction time and the result supports non selective access. We also point out that the inhibition effect is interacting with decision making, and so the time taken for the wrong code switched option is more than the correct code switched option.

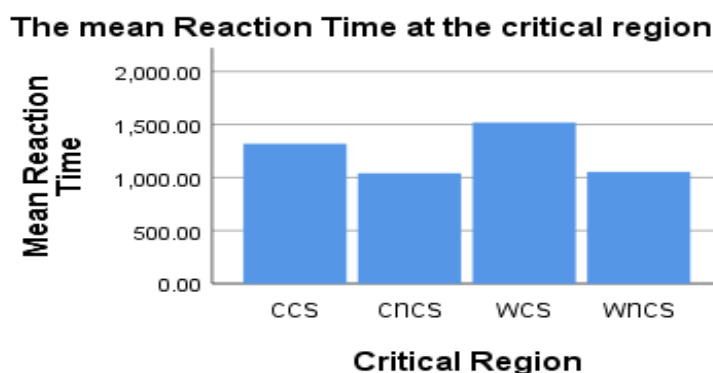
### **Results**

The main aim of this experiment was to cross-check the time course of activation for the target or the non-target language. Table 2 shows the obtained mean reaction time for each of the critical regions. Figure 3 shows the mean time taken for a correct or an incorrect response, when participants were shown a comprehension question. Most of the responses were correct, because the comprehension questions were easy and were directly related to the stimuli. However, the time taken for incorrect responses was more than that for correct responses. This establishes the fact that participants were employing a very high level of inhibitory mechanism while choosing yes or no when answering

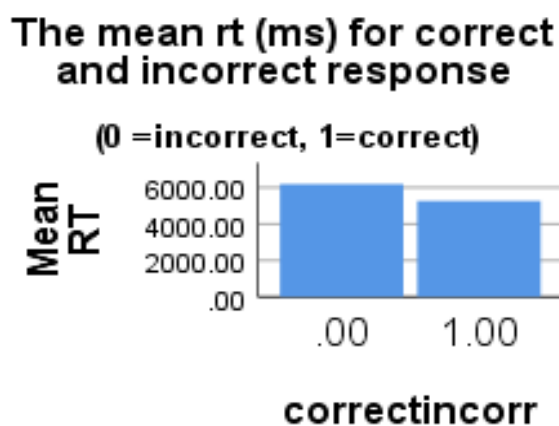
comprehensive questions. Moreover, when inhibitory control mechanisms are more active it means that both the target and non-target language are highly active. This is also one of the reasons for the inclination towards non selective access in this study.

**Table 2. The reaction time in milliseconds (ms) for all the conditions at the critical region**

labels	ccs	1318.88
	cncs	1040.47
	wcs	1517.08
	wncs	1054.07



**Figure 2. A bar graph showing the mean of reaction time at critical region for all the conditions**



**Figure 3. A bar graph showing the mean of rt for correct and incorrect responses**

## Discussion

Prior research has investigated types of lexical access during bilingual language control. The question of the extent and degree of activation has also been considered in various experiments. Most research findings favour bilingual non selective access. However most studies conducted in this field have used cognates and interlingual homographs to establish the cognitive connection between the target and non-target language. Cognates mostly show a facilitation effect, whereas interlingual homographs display an interference effect. In the puzzle, there is a larger block that always remains isolated;

context is always ignored while looking at language activation. Context and language cannot be seen in isolation. With contextual priming in the experiments using proper nouns as the prime, this study has shown that the degree of activation varies from one target language to another, but it mostly remains non selective. It has been hard to find the presence of partial selectivity. Moreover, we tried to answer questions related to the time course of activation of the respective target or non-target language. In Experiment 2, we used comprehension questions to test the time course of activation of the code switched and non code switched word after the critical region disappeared. Thus, we found non selective access in high proficient Hindi-English bilinguals.

## Conclusion

The future plan for this line of research involves using a picture to probe the participants in an eye tracking paradigm instead of priming the participants using proper nouns. Although this study considers the level of activation of the target and non-target language, the main question is why partial selective access is not ubiquitous in nature, if present. If further studies prove the presence of partial selectivity, then the conditions of its existence need to be determined. One of the probable answers to this question could be that bilingualism behaves in a different manner in different situations. The models of bilingualism for lexical access, comprehension or production will need to be revised in that case depending on contexts and scenario. A more naturalistic tinge can be provided to the stimuli used in the experiments in order to get more reliable and unbiased data.

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## **Early grammatical development in Cyprus: A CDI study**

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**Abstract.** The current study investigates the grammatical development of young children growing up in Cyprus and acquiring Cypriot Greek as their first language. The study of grammatical development in Greek has made important steps in the last two decades, but this is the first large-scale investigation in children under 3 years of age. To this purpose, the MacArthur-Bates Communicative Development Inventory was used to collect data from parents of children in five age groups: 18, 21, 24, 27 and 30 months of age. The data included information on several grammatical features, such as the formation of plural in nouns, the change of present tense verb endings to denote different persons, past tense and aspect, among others. Data on children's utterance length (MLU3-w) were also collected as a measure of morphosyntactic abilities. The analysis showed a significant increase in children's grammatical complexity as well as utterance length with age, with an interesting increase in grammatical features sometime in the first half of the third year, i.e. around 24 to 27 months. This is the first systematic study of Greek (both Cypriot Greek and Standard Modern Greek) grammatical development with children in their second and third year of life and can provide researchers and clinicians with useful insights into the acquisition of Greek.

**Keywords:** grammatical development, Cypriot Greek

### **Introduction**

The grammatical development of young children acquiring Greek has been the focus of research on language acquisition for the past 20 to 30 years in mainland Greece, while a different line of research has been set more recently on the island of Cyprus with children acquiring Cypriot Greek (henceforth CG) as their first language. In this line of work, studies have focused on specific grammatical features, while a considerable part of it has been carried out as part of research on developmental language disorders.

In Cyprus, extensive work has been carried out on the acquisition of clitics by Petinou and Terzi (2002) in children aged 2;8 to 3;0 years, and at a larger scale in terms of sample numbers and age groups (3-5 years) by the Cyprus Acquisition Team (see Grohmann, 2011). All of these studies agree that clitics are acquired by age 3, and even earlier, and follow the developmental patterns of older children (up to 5 years of age) as well as of children with language disorders. The production of both object and subject relative clauses has also been studied by the Cyprus Acquisition Team in children from 5 to 9 years of age confirming a more general cross-linguistic trend for difficulties in the acquisition of object relative clauses but not subject relatives (Theodorou & Grohmann, 2012). A different line of research within the same group studied the development of subjective structures in children with Down Syndrome from 5-18 years of age, and typically-developing controls from 2-6 years (Christodoulou & Grohmann, 2018), as well as the development of case, both syntactic and morphological, in adults with Down Syndrome and children of 7-8 years of age, showing ceiling effects in its acquisition (Christodoulou & Wexler, 2016).

Past tense acquisition has been the focus of work by Mastropavlou, Petinou, Tsimpli, and Georgiou (2019) in 5-year-old children with SLI along with typically-developing chronological aged controls and language-matched controls from 3;4-4;2 years of age. Although the focus of the latter study was on the characteristics of grammar in SLI, typically-developing 5-year-olds showed almost ceiling effects in the formation of past tense, while typically-developing 3-4-year-olds performed higher than the group with SLI, and their formations were accurate more than 90% of times. Passives were the focus of a cross-linguistic investigation in 5-year-olds, and children acquiring CG were shown to

comprehend short passives, but full passive constructions were not yet found to be robust (Armon-Lotem, Haman, Jensen de López, Smoczynska, Yatsushiro, Szczerbinski, ... & van der Lely, 2016).

The above studies demonstrate the absence of a systematic large-scale study on grammatical development in children younger than 3 years both in mainland Greece and in Cyprus, which the current study aims to provide. The MacArthur-Bates Communicative Development Inventory (CDI) is used to investigate different aspects of Greek grammar in an effort to fill this gap by presenting data from toddlers aged 18 to 30 months on different aspects of their grammatical development.

## Method

### Participants

Parents of children in five age groups (18, 21, 24, 27, and 30 months) participated in this study. Table 1 shows the mean age and standard deviation, as well as the number of children and the gender distribution in each of the five groups. All children were recruited for the LexiKyp project (CG-CDI).

**Table 1. Participants' information for the five age groups (mean age, gender distribution and mean vocabulary score)**

Age group	Mean Age in months (standard deviation)	Number (female/male)	Mean vocabulary score (standard deviation)
18	17.85 (0.35)	44 (24/20)	72.97 (78.69)
21	20.78 (0.36)	36 (18/18)	142.47 (112.26)
24	23.91 (0.36)	32 (12/20)	289.16 (147.82)
27	26.92 (0.33)	28 (16/12)	385.07 (158.52)
30	29.76 (0.40)	33 (11/22)	411.82 (188.58)

All children were exposed only to Cypriot Greek from birth, and on a daily basis. None of the children was systematically exposed to any other language; children were excluded if the parents reported that the child was exposed to another language more than 10 hours per week. All children were full-term (not more than 6 weeks premature) and had no history of hearing problems, ear infections, or any kind of language impairment/problem. The questionnaire was completed only by mothers.

### Cypriot Greek grammatical system

Greek morphology, both CG and Standard Modern Greek, is rich in the sense that different semantic relations are expressed in the form of bound morphemes, mostly endings, which are attached on verbs and nouns. Verb stems and endings encode information about person, number, tense, voice, and aspect of the action. For example, the form *αγαπ-ώ* (/a'ga'po'/ 'I love') is the first person, singular, present tense, imperfective aspect and active voice of the verb 'to love', while *αγαπ-ούμε* (/a'ga'pume/ 'we love') is the first person, plural, present tense, imperfective aspect and active voice of the same verb. *Αγαπ-ιέμαι* (/a'ga'pieme/ 'I am loved'), on the other hand, is the first person, singular, present tense, imperfective passive voice of the verb. The first person, singular, active voice, past tense, *perfective* form of the verb is *αγάπ-ησ-α* (/a'ɣapisa/ 'I loved'), where *-ησ-* is the past tense suffix and *-α* the first person singular ending, while the first person, singular, active voice, past tense but *imperfective* form is *αγαπ-ούσ-α* (/a'ga'pusa/ 'I was loving'), where *-ούσ-* is the past tense imperfective suffix and *-α* the first person singular ending.

Nouns also encode different kinds of information in their endings, such as gender, number, and case. The word *αγάπ-η* (/a'ɣapi/ 'love') is singular, feminine, nominative/accusative case, while *αγάπ-ες* (a'ɣapes) is the equivalent in plural. All nouns are accompanied by articles (definite or indefinite), which also encode the same kind of information; gender, number, and case. Adjectives also need to agree with nouns in the same dimensions, encoded in their endings. For example, in the phrase *τον τεράστιο ελέφαντα* (/ton te'rastio e'lefada/), the definite article *τον* 'the', as well as the adjective

τεράστιο ‘huge’ both agree in number (singular), gender (masculine), and case (accusative) with the noun ελέφαντα ‘elephant’.

### ***CG-CDI: Words & sentences***

The CG adaptation of the MacArthur Bates Communicative Development Inventory *Words & Sentences* (Fenson, Dale, Reznick, Bates, Thal, & Pethick, 1994) was used in this study. The *CDI: Words & Sentences* consists of two sections: Part I: *Words Children Use* and *Word Use*, and Part II: *Sentences & Grammar* and *Word Combinations*. Part I refers to children’s lexical development and has been described in detail in Taxitari, Kambanaros, Floros, and Grohmann (2017). A description of Part II, which refers to grammatical development, is provided below.

#### ***Part II: Sentences & grammar and word combinations***

This part consists of six sections designed to study the use and development of morphosyntax by young children. Section 1, *Use of grammar*, includes 8 questions which could be answered on a 3-point scale (never – sometimes – often) about the use of different grammatical markers by the child. Sections 2–5 investigate grammar in more detail with questions targeting several aspects of Greek morphology. The first question of each section is always a yes-no question and involves whether the child had already begun using the grammatical point, while a different question asks parents whether the child makes any mistakes in creating the right grammatical form, and if so, to give some examples. In sections 2 (Plural), 3 (Verbs – Present, Past and Duration) and 5 (Nouns), multiple choice questions are provided and parents are asked to choose how their child would form the corresponding grammatical form among several forms, some correctly and some incorrectly formed. These questions provide an opportunity to control for the accuracy of children’s use of grammar, apart from mere use of the grammatical point in question, as the parent indicates the form their child uses. Section 4 (Negation) focuses on the particles used to form negation. Finally, Section 6 is divided into two parts: the first part is about sentence size and asks parents to write the three longest phrases their child has recently produced. The second part is about word combinations and asks parents to choose among two possible phrases the one their child produces. This section is a summary of all the grammatical points provided above in the form of actual examples.

### ***Procedure***

Mothers were contacted when their child reached the right age for the study in one of five age groups: 18, 21, 24, 27, and 30 months, with each parent participating in only one age group. Prior to the study, full ethical approval was obtained from the Cyprus National Bioethics Committee.

For each morphosyntactic feature, parents were asked if their child had started producing that specific element; if the parent answered yes, they would then proceed to more detailed questions. If they answered no, they would skip the remaining questions related to the particular element, and proceed to the next.

### ***Scoring***

For every grammatical point in sections 2-5, that the parent reported their child produced, a single point was given for up to 11 points. These included Plural-Nouns, Present Tense Person Endings, Past Simple, Past Continuous, Aspect, Future Tense, Negation, Definite Article, Indefinite Article, Noun-Adjective Agreement, Comparatives.

In multiple choice questions, the child received 1 point for every correct formation of the corresponding grammatical point.

Finally in section 6, the number of words in each of the three longest sentences provided by parents was calculated, following previous use of MLU from the CDI (Fenson et al., 1994). Repetitions (for example “woof woof”) or names (for example “Harry Potter”) were calculated as single words.

### ***Measures***

A *grammatical feature usage* measure was calculated on the basis of parental feedback about the use

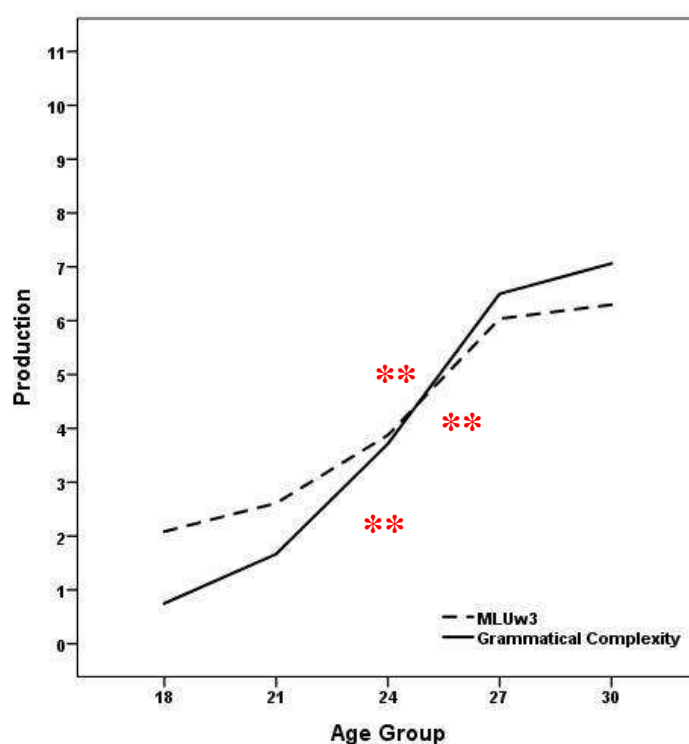
of each individual feature by calculating the percentage of infants who produce that feature at a specific age.

A *total morphosyntactic score* was calculated as a measure of grammatical complexity, on the basis of the number of morphosyntactic features the parent reported their child to produce. Eleven such features were included in this measure as described in section *Scoring*.

Finally, an *MLU3-W* measure was calculated by summing up the number of *words* in each of the three longest sentences parents provided for their child, and dividing by the number of phrases the parent provided, in order to yield a mean phrase length. It was decided to use MLU in Words in this study, as previous studies have indicated that MLU in words and MLU in morphemes provide similar results (Ezeizabarrena & Fernandez, 2018), and MLU in words is more straight-forward to calculate especially in a highly-inflected language such as Greek.

## Analysis

One-way Analyses of Variances (ANOVAs) with Grammatical Complexity/Grammatical Feature/MLU3-w as a dependent variable and Age as a fixed factor compared the performance of children across ages in their overall grammatical ability or for specific grammatical features. LSD post-hoc tests compared each age group to the other for individual grammatical features.



**Figure 1. Mean Grammatical Complexity and mean MLU3-w in the five age groups. One-way ANOVAs showed a significant increase with Age for both measures ( $ps < .01$ ). LSD post-hoc tests showed significant increases in Grammatical Complexity and MLU3-w between 21 and 24 months, as well as between 24 and 27 months of age, but not among the rest of the ages**

## Results

### *Grammatical complexity*

A one-way ANOVA with Grammatical Complexity as a dependent variable and Age as a fixed factor showed a significant effect of Age on the number of grammatical features children produce ( $F(4,163) = 27,90, p < .01$ ). Planned post-hoc comparisons showed that all age groups differed from each other ( $ps < .05$ ) except 18- and 21-month-olds, and 27- and 30-month-olds. Figure 1 shows the increase in grammatical complexity with age.

#### *MLU3-w*

A one-way ANOVA with MLU3-w as a dependent variable and Age as a fixed factor showed a significant effect of Age on the mean number of words children produce in their longest utterances as reported by parents ( $F(4,145) = 18,07, p < .01$ ). Planned post-hoc comparisons showed differences between all age groups ( $p < .01$ ) except 18-21 months, 21-24 months and 27-30 months. Figure 1 shows the increase in MLU3-w with age.

#### *Nominal morphology*

One-way ANOVAs with Age as a fixed factor and Use of individual nominal morphology measures (Plural Nouns, Definite Article, Indefinite Article and Noun-Adjective Agreement) were conducted and showed a significant effect of Age in all measures: Plural Nouns:  $F(4,166) = 15,79, p < .01$ , Definite Article Use:  $F(4,166) = 17,45, p < .01$ , Indefinite Article:  $F(4,164) = 10,49, p < .01$ , Noun-Adjective Agreement:  $F(4,166) = 19,62, p < .01$ . Figure 2 shows the increase in use of these features across ages.

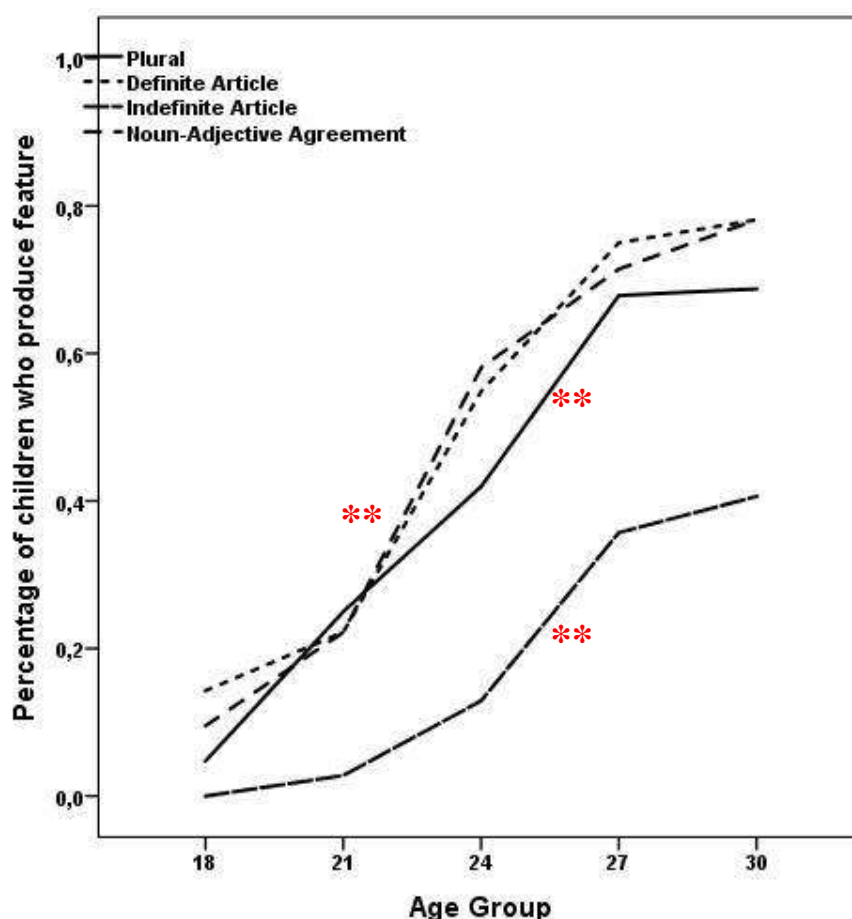


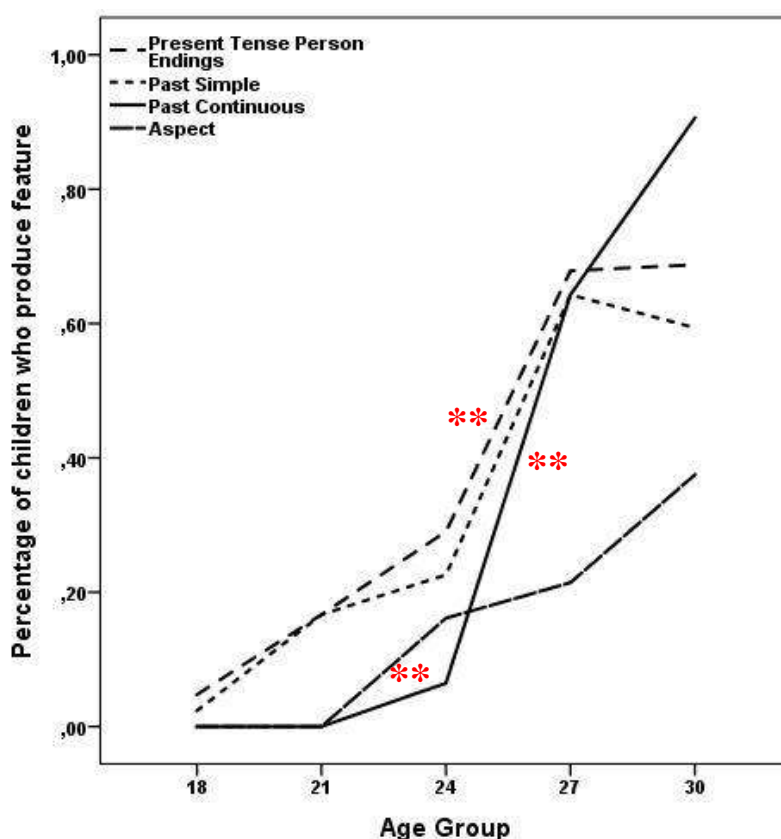
Figure 2. Percentage of children who are reported to have begun using the Nominal Morphology features, Plural Nouns, Noun-Adjective Agreement, Definite and Indefinite Article, in the five age groups. One-way ANOVAs showed a significant increase with Age for both features ( $ps < .01$ )

Planned post-hoc comparisons compared the performance of each age group to each other for both measures and all features. Age groups were found to differ from each other ( $p < .01$ ), except the following: 18-month-olds did not differ from 21-month-olds in any of the measures and features, as did not 27-month-olds from 30-month-olds. Plural Nouns also did not differ at 21 and 24 months, Definite Articles did not differ from 24 to 27 months, Indefinite Articles did not differ from 18 and 21 months to 24 months, and finally Noun-Adjective agreement did not differ between 24 months and 27-30 months.

### Verbal morphology

One-way ANOVAs with Age as a fixed factor and Use of individual verbal morphology measures (Present Tense Person Endings, Past Simple, Past Continuous and Aspect) were conducted and showed a significant effect of Age in all measures: Present Tense Person Endings:  $F(4,166) = 17,54$ ,  $p < .01$ , Past Simple:  $F(4,166) = 15,22$ ,  $p < .01$ , Past Continuous:  $F(4,164) = 5,10$ ,  $p < .01$ , Aspect:  $F(4,165) = 8,75$ ,  $p < .01$ . Figure 3 shows the increase in use of these measures with Age.

Planned post-hoc comparisons compared the performance of each group to each other for all measures. Age groups were found to differ from each other ( $p < .01$ ), except the following: 18-month-olds did not differ from 21-month-olds in any of the measures and features, as did not 27-month-olds from 30-month-olds. Additionally Present Tense Person Endings did not differ between 21 and 24 months, Past Simple and Past Continuous did not differ from 18 and 21 months of age to 24 months, while finally Aspect did not differ between 24 and 27 to 30 months.



**Figure 3.** Percentage of children who are reported to have begun using the Verbal Morphology features, Present Tense Endings, Past Simple, Past Continuous and Aspect, in the five age groups. One-way ANOVAs showed a significant increase with Age for both features ( $ps < .01$ )

## Discussion

The aim of the current study was to investigate early grammatical development in Cypriot Greek in young children from 18 to 30 months. As expected, children's overall grammatical complexity, as well as their MLU3-w increased with age. The same applied for the different grammatical features investigated in this study. However, each feature followed a different developmental pattern with some features developing more slowly than others. For example, regarding nominal morphology, the acquisition of the indefinite article was slower than definite articles, plural and noun-adjective agreement. On the other hand, regarding verbal morphology, the acquisition of perfective aspect developed slower than present tense person endings, past tense and past continuous.

Comparisons between age groups for the different measures showed significant increases sometime at the end of the second year and the beginning of the third year. This increase coincides with a significant increase in the children's lexicon noted by Taxitari et al. (2007) in their analysis of the vocabulary section of the CG CDI, indicating interesting relationships between the lexicon and grammar in development reported in other languages as well (Devescovi, Caselli, Marchione, Pasqualetti, Reilly, & Bates, 2003). This "morphology spurt" around 24 months is also reported by Christofidou and Stephany (2003) for Greek as well as Russian in their analysis and comparison of aspect development between a Greek and a Russian boy. This increase then could suggest a transitional stage in children's language acquisition, and the relationship with the lexicon could point to intriguing relationships between different linguistic levels in language development.

## Conclusion

The current study contributes additional information to the analysis of the development of vocabulary of these children in previous work (Taxitari et al., 2017), allowing for a more complete picture of the children's language development in the bilingual community of Cyprus, as well as comparisons between lexical and grammatical development in such young ages for Greek. This is the first systematic study of Greek grammatical development with children in their second and third year of life and can provide researchers and clinicians with useful insights into the acquisition of Greek.

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