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Is Bilectalism Similar to Bilingualism? An Investigation into Children's Vocabulary and Executive Control Skills

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1. Introduction

Recent research has investigated the consequences of bilingualism for cognitive development (e.g. Bialystok et al. 2009). This research has revealed two major trends: disadvantages in the realm of language (mostly in terms of delays that are eventually overcome, see below) and advantages in the realm of cognition. In this study we set out to explore whether bilectalism, the linguistic condition of speaking two different varieties of the same language, has a similar effect on children's linguistic and cognitive performance.

The structure of this paper is as follows. First, we summarize the findings of previous research that examined the impact of bilingualism on children's cognitive skills. Then, we briefly describe the linguistic situation in the Republic of Cyprus from where our sample of bilectal and multilingual children was drawn. Finally, we present our own study and its results.

1.1. The effect of bilingualism on linguistic and cognitive development

Bilingual children have been reported to present delays in some aspects of their linguistic development. One area in which such a delay has been reported is vocabulary development. Research with bilingual children has typically shown that they know fewer words in each of their languages than their monolingual peers, although this difference might disappear when considering conceptual or total vocabulary (e.g. Oller & Elliers, 2002). Similar results have been also reported for aspects of bilingual children's morpho-syntactic knowledge. A study by Nicoladis et al. (2007), for instance, reported that 4- to 6-year-old simultaneous bilingual children were less likely to produce correct past tense forms than age-matched monolinguals. These delays in bilingual

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language acquisition, however, largely reflect properties of the bilinguals' linguistic input (such as the lower level of exposure to each language; e.g. Oller & Elliers 2002) rather than (cognitive, perceptual or other) problems in the process of acquiring language. It should also be noted that despite these delays, bilingual children have been found to perform equivalently (e.g. Antoniou et al. 2013), or, in some cases, even better than monolinguals on measures of conversational ability (e.g. Siegal et al. 2009).

At the same time, recent research has reported beneficial effects of bilingualism in the realm of non-linguistic cognitive functioning. A growing body of evidence has shown that the regular use of two languages enhances bilingual children's executive control skills (e.g. Bialystok et al. 2009). Executive control (henceforth, EC) is generally described as a set of cognitive processes that underlie flexible, goal-directed behavior. An influential account proposed by Miyake et al. (2000) suggests that EC comprises three core components: switching (the ability to flexibly switch attention between rules), working memory (henceforth, WM; the ability to simultaneously maintain and manipulate information in mind) and inhibition (the ability to suppress dominant, automatic responses or irrelevant information).

Bilingual advantages in EC have been observed across childhood and in a variety of tasks that supposedly tap each of the EC components independently or a combination of those (see Bialystok 2011). However, most of this research has reported advantages in tasks requiring conflict resolution and inhibition (henceforth, interference tasks; see Bialystok et al. 2009). There is also evidence for advanced switching (e.g. Barac & Bialystok 2012) and WM skills (Morales et al. 2013) in bilingual children, although this evidence is yet suggestive as only a few studies have been so far reported (see Bialystok et al. 2009).

It should be noted, however, that the bilingual advantage in interference tasks has not always been replicated and some researchers have raised concerns that the advantageous performance of bilinguals might have been due to factors other than bilingualism, that have not been adequately controlled in previous studies. Morton & Harper (2007), for instance, argued that reported differences in bilingual and monolingual children in these tasks might have been due to uncontrolled demographic factors such as ethnicity and socioeconomic status. When directly controlling for these factors they found no differences in bilingual and monolingual children's performance in the Simon task. Nevertheless, subsequent studies that also controlled for these factors still reported a bilingual advantage (e.g. Carlson & Meltzoff 2008; Yang et al. 2011).

Why might bilinguals show these benefits in EC? Early work by Bialystok (e.g. 2001) proposed that the bilingual EC advantage can be traced solely in inhibition: because both languages are activated when a bilingual speaks in one of them, fluent use of the intended language requires the inhibition of the non-target language. This constant experience in managing two active conflicting linguistic systems via inhibition enhances bilinguals' inhibition mechanisms.

This early view, however, has been challenged on several grounds (see e.g. Bialystok et al. 2012). First, effects of bilingualism have been also reported for bilingual infants for whom language production has not yet started and therefore the need to suppress a non-target language is not relevant. Second, advantageous performance for bilinguals has been reported not only in tasks that engage inhibition but also in tasks that require the recruitment of other EC components or even the entire EC network. A final challenge comes from another finding that has consistently emerged in studies that employed interference tasks with bilingual and monolingual populations. Typically, interference tasks require participants to provide responses to two types of experimental trials: incongruent trials where conflicting task-irrelevant information is presented and congruent trials where no interfering information is present. The interference effect calculated as the difference in reaction times between responses in incongruent and congruent trials is the standard measure taken from these tasks and is considered to be the main indicator of participants' inhibitory control skills. However, as Hilchey & Klein (2011) recently argued, bilingual advantages on interference effects are relatively elusive in studies with children and young adults. A more robust finding is that bilinguals show a global advantage in reaction times in both congruent and incongruent trials. Hilchey & Klein (2011) suggest that this finding is simply not consistent with the hypothesis of a bilingual advantage in inhibition. If inhibition were the process affected by bilingualism then one would expect faster performance only in incongruent trials and a smaller interference effect for bilinguals. Thus it is proposed that the bilingual advantage in interference tasks might be better characterized in terms of an enhanced general executive system that is responsible for monitoring conflict (rather than resolving conflict). Recently, Bialystok (2011) endorsed an integrative approach which explains the bilingual advantage in terms of a better ability to coordinate or jointly recruit the different EC components.

1.2. The linguistic situation in Greek-speaking Cyprus

The Republic of Cyprus provides a fruitful linguistic landscape to explore questions related to bilectalism. The linguistic situation in Greek-speaking Cyprus is typically characterized as one of diglossia with the local vernacular, Cypriot Greek (CG), acting as the low variety and Standard Modern Greek (SMG), as the high variety (see e.g. Grohmann & Leivada 2012). CG is a non-standardized, non-codified, variety generally described as a dialect of Greek (e.g. Newton 1972). SMG is the official language of the Republic and the language of education in all state schools. The former is natively and naturalistically acquired and it is used in all informal situations and everyday face-to-face interactions. The latter is acquired sequentially, mainly through formal education, it is used in all formal situations, particularly in writing and public speech and it is the language of the media. CG and SMG substantially overlap in both grammar and lexicon although they also present several differences in all levels of linguistic analysis (Arvaniti 2010): morphology (e.g. different third person plural morpheme in present tense), syntax (e.g. CG has enclisis instead of proclisis), phonetics (e.g. CG replaces the SMG voiced stops with voiceless or prenasalized voiced stops), phonology (e.g. CG possesses palato-alveolar consonants, which are lacking from SMG), pragmatics (Greek-Cypriots and Greeks use different politeness strategies; see e.g. Terkourafi 1997) and in the use of certain lexical terms.

1.3. The present study

This study aims to establish the linguistic and cognitive profile of bilectal children as compared to that of multilinguals and monolinguals. In this respect, it has the potential to address one of the pending questions in the research on the cognitive and linguistic outcomes of bilingualism: that is, whether speaking two closely related languages (or varieties in this case) can give rise to similar effects on cognitive development as bilingualism. It can also reveal whether such advantages can arise independently of any cultural or ethnic differences as bilectal and monolingual children in this study come from two countries that are known to differ minimally, if any at all, in these factors.

2. Method

2.1. Participants

There were 136 children in this experiment, consisting of 64 bilectal children (in CG and SMG; 32 boys and 32 girls; ages 4.5–12.2, mean age 7.8, SD 1.6 years), 47 multilinguals (bilectals in CG and SMG, also speaking English and in some cases an additional language; 24 boys and 23 girls; ages 5.0–11.5, mean age 7.8, SD 1.8 years) and 25 monolinguals (speakers of only SMG; 15 boys and 10 girls ages 6.21-9, mean age 7.4, SD 0.87 years).

Multilingual children were recruited from private schools in the Republic of Cyprus. The schools offered English-speaking programs in accordance with the national curriculum of the UK. Children's linguistic background was examined through a questionnaire completed by their parents with the consent form. All multilingual children were multilingual to the extent that they lived in a Greek-speaking bilectal community and attended an English-instruction school. They had variable linguistic background characteristics. 11 multilingual children were reported to be exposed to other language(s) at home besides Greek[1] and English. In terms of age of onset of exposure to additional language(s), 37 of the children were reportedly exposed to two languages from birth, seven were exposed to a second language by 36 months, one from 48 months and two from 72 months of age. With respect to length of exposure, all children had at least four years of exposure to an additional language besides a 5-year-old who had approximately three years and two 7-year-olds with approximately one year of additional language exposure. Regarding linguistic exposure within the family 34 multilingual children had parents who spoke different native languages (one CG and the other another language) suggesting a multilingual home environment. 14

[1] We use the term *Greek* to refer collectively to both the CG and SMG varieties.

multilingual children had both parents speaking either CG (12) or English (2) as a native language suggesting a less multilingual home experience.

In the bilectal group, 36 children were recruited from a private primary school, eight from a private nursery school and the rest from a public primary school. All schools offered traditional Greek-speaking programs with limited exposure to a second language. Four bilectal children were excluded from the analyses because one of their parents spoke a language other than Greek.

Monolingual children were recruited from a Greek-speaking private primary school in Athens, Greece.

2.2. Materials and procedure

Children were tested in two sessions of 50-60 minutes each in a quiet room in their school. The EC and linguistic measures administered are described below (see Antoniou et al. 2013 for a more detailed description).

2.2.1. Language proficiency measures

Word Finding Vocabulary Test: The standardized Greek version (Vogindroukas et al. 2009) of the Renfrew Word Finding Vocabulary Test (Renfrew 1995) was administered to assess expressive vocabulary. Words from both CG and SMG were accepted as correct.

Greek (CG or SMG) Comprehension Test: This was part of a conversational test designed by the authors to examine children's comprehension of implicatures. The complete test was administered for the needs of another study. There were 15 test items, one practice item and 48 filler items (short stories or sentences). Bilectals and multilinguals took the test in CG and monolinguals in SMG. Children's score in the practice and filler items was taken as a measure of their comprehension abilities in Greek (CG or SMG).

Peabody Picture Vocabulary Test-Revised (PPVT-R; Dunn & Dunn, 1981): This was administered as a test of receptive vocabulary knowledge. It involved hearing a word and indicating the picture that corresponds to that word out of four possible choices. This test was taken only by the monolingual children (in SMG) and a subset of 17 bilectal children (in CG).

2.2.2. Working memory tests

The Backward Digit Span Task (Wechsler, 1949): In each trial of this task participants heard a list of numbers (e.g. *5, 6, 3*) and had to repeat the numbers in reverse order (e.g. *3, 6, 5*). One point was awarded for each successful trial.

The Corsi blocks task: This was an online computerized version of the Corsi Blocks task (Corsi 1973). In the forward condition of the task a number of boxes lit up in a specific order and participants were instructed to click on the boxes in the same order. In the backward condition participants had to click on the boxes in the reverse order. One point was awarded for each successful trial.

2.2.3. Inhibition tests

The Soccer Task: This was an online Stop-Signal task. In each trial children were presented with displays showing two soccer pitches. They were instructed that when a ball appeared on the right pitch they had to press the right arrow key on the keyboard and when the ball was on the left pitch they had to press the left arrow key. Children had to respond as quickly and accurately as possible. On approximately 20% of the trials the children heard a referee blowing his/her whistle. When they heard the whistle, they had to stop and not press any buttons until the next display appeared. In stop trials the time interval between the presentation of a stimulus and the emission of the stop signal cue varied depending on the participant's performance. This procedure ensured that participants will correctly inhibit a response approximately 50% of the time. When the time interval increased, it was more difficult to correctly inhibit a response. Thus, if a participant was performing well, the time interval increased until a mistake was made. If the participant's performance was poor, the delay period decreased. The main dependent variable was the Stop Signal Reaction Time (SSRT). This was calculated by subtracting the average delay period in stop-signal trials from the average reaction time of responses in the go trials.

The Simon Task (Simon, 1969): In this task participants were asked to press the right arrow key if a red square appeared on the screen and the left arrow key if a green square appeared. In congruent trials (1^{st} block) the square appeared on the same side as the correct key while in incongruent trials (1^{st} block) it appeared on the opposite side to the correct key. In neutral trials (2^{nd} block) the square appeared at the center of the screen. The main measure was the difference in mean reaction times between congruent and incongruent trials (Simon effect).

2.2.4. Switching test

The Color-Shape Task: In each trial of this task participants were presented with a display that comprised several simultaneous stimuli. The first was the target figure at the center of the display. This could be either a triangle or a circle and either of blue or red color. Secondly, two small figures were shown at the bottom of the display, one on the left and one on the right. Similarly, these figures could be either a triangle or a circle and either red or blue. Finally, a cue was presented at the top of the display. When the cue comprised two small green *X*s, the children had to select the small figure that matched the big figure for color (color game) and when it comprised two small squares they had to match by shape (shape game). Children had to respond as quickly and accurately as possible. The experiment comprised a pure color, a pure shape and two mixed blocks. The two mixed blocks included switches between the two games every two trials. Repeat trials occurred when children repeated the same game as the previous trial while switch trials occurred when participants changed to a different game from the previous trial. The main dependent measure was the switching cost calculated by subtracting mean reaction time in correct repeat trials from mean reaction time in correct switch trials in the mixed blocks.

2.2.5. Test of non-verbal IQ

The WASI Matrix Reasoning Test (Wechsler 1949): In this test participants were presented with pictures depicting a matrix from which a section was missing. They were required to complete it by pointing at or stating the number of the correct response from five possible choices.

2.2.6. Socioeconomic status measures

The Family Affluence Scale (Currie et al. 1997): This questionnaire was administered as a measure of the children's family wealth. It included items such as: *Does your family own a car, van or track? (No [0]; Yes, one [1], Yes, two or more [2]).* Each child could get a score from 0–9.

Level of maternal and paternal education: A parent received a score of *1* if s/he had completed only junior high school, *2* if s/he had completed senior high school, *3* if s/he additionally had some professional training and *4* if s/he had a higher education degree.

3. Results

3.1. Preliminary analyses

3.1.1. Executive control components

The main dependent measures from the five EC tests were submitted to a principal component analysis (PCA). This allowed us to identify underlying dimensions of the EC construct and establish which of those are specifically affected by multilingualism or bilectalism. The analysis was conducted on the whole sample of participants. The following measures were entered into the analysis: Simon effect[2] (Simon task), switching cost (Color-Shape task), number of correctly recalled trials in the BDST, in the forward and in the backward conditions of the Corsi Blocks task and SSRT (Soccer task). The PCA was conducted with orthogonal rotation (varimax). The analysis indicated that two components had eigenvalues over Kaiser's criterion of 1 and in combination explained 50.2% of the variance. Scores in the BDST and in the forward and backward condition of the Corsi Blocks task clustered on one component which we interpreted as representing the *Working Memory* aspect of EC, while the switching cost, Simon effect and SSRT scores loaded on the second component which we interpreted as representing the *Inhibition* aspect of EC.

3.1.2. Composite scores

[2] The Simon effect, switching cost and SSRT scores were reversed scored by multiplying with -1 so that for all measures a high positive score indicated superior performance.

The following composite scores were computed: a composite score for overall performance in the five EC tests (EC score) and, following the PCA, composite scores for the three WM and the three Inhibition measures. This allowed us to (1) obtain more reliable and robust indicators of the EC construct and its components, (2) increase the power of the experiment by including more participants since composite scores were still calculated for a child even if s/he had missing data in any of the EC tasks (see e.g. Carlson & Meltzoff 2008) and (3) decrease the dependent variables and therefore the risk of type I error which becomes higher when performing multiple comparisons on the dependent measures of each EC task independently. The composite scores were calculated for each participant by transforming into z-scores and then averaging participants' scores in the relevant measures. Finally, in order to reduce the number of control variables and, again, obtain more reliable indicators of the factors of interest, composite scores were also created for background variables that are conceptually related and significantly correlated with each other. Greek expressive vocabulary score[3] and language comprehension score-Greek (CG for bilectals and multilinguals and SMG for monolinguals) significantly and positively correlated with each other (Spearman's rho(two-tailed)=.232, p<.01) and were collapsed into a single score indicating general linguistic ability in Greek. This score was used in comparisons 1 and 2 (see *Main Results* section). Similarly in the sample of children who also took the PPVT, PPVT score-Greek (CG for bilectals and SMG for monolinguals) significantly correlated with the general linguistic ability score-Greek (r(two-tailed)=.69, p<.0001) and therefore the two scores were again collapsed into a single indicator of linguistic ability in Greek. This linguistic score was used only in comparison 3 of the *Main Results* section. Finally, significant positive correlations were found between maternal and paternal level of education and FAS score (for paternal and maternal education level: Spearman's rho(two-tailed)=.583, p<.0001, for paternal education and FAS: Spearman's rho(two-tailed)=.334, p<.0001, for maternal education level and FAS: Spearman's rho(two-tailed)=.216, p<.01) and the three scores were also collapsed into a single socioeconomic status score (SES).

3.2. Main analyses

Results are presented in three steps: in the first step we compared the performance of bilectal and multilingual children. This comparison was based on the whole sample of bilectal (n=64) and multilingual children (*n*=47). In the second step we compared the performance of the bilectal and multilingual groups to that of the monolingual group after matching the three groups for age. In the third step we compared the performance of a subset of bilectal children to

[3] We collapse the distinction between CG and SMG and call the score, a *Greek expressive vocabulary score* (similarly for the *general linguistic ability score*) because, in the expressive vocabulary test, words coming from both varieties were accepted as correct.

that of the monolingual group after more stringently controlling for linguistic performance in the language of testing. All between-group analyses included the following as covariates: (1) any background measures for which statistically significant differences were found between the groups compared and (2) any background measures that significantly correlated with the dependent variables[5].

3.2.1. Comparison 1

Participants: The performance of 64 bilectals (32 boys, 32 girls; ages 4.5–12.2, mean age 7.8, SD 1.6 years) and 47 multilinguals (24 boys, 23 girls; ages 5.0–11.5, mean age 7.8, SD 1.8 years) was compared in the following analyses.

Demographic characteristics: The two groups did not statistically differ for IQ, age, gender or language comprehension-Greek (F(1, 106) =1.329, p>.05, F(1, 109) =.010, p>.05, F(1, 109) =.012, p>.05, (F(1, 97) =0.238, p>.05, respectively). However, multilingual children had a higher socioeconomic status (F(1, 106) =18.537, p>.0001).

Expressive vocabulary: Expressive vocabulary significantly and positively correlated with IQ (Spearman's rho(two-tailed)=.18, p<.05), language comprehension-Greek (Spearman's rho(two-tailed)=.23, p<.01) and age (Spearman's rho(two-tailed)=.29, p<.0001). An ANCOVA with language group as a between subjects factor and SES, IQ, age and language comprehension score as covariates showed a significant effect of group (F(1, 87)=67.77, p<.0001, r=.66) in that bilectals had a higher vocabulary than multilinguals.

Executive control: All three global EC scores (EC, WM and Inhibition) significantly correlated with IQ (Spearman's rho(two-tailed)=.57, p<.0001, Pearson's r(two-tailed)=.57, p<.0001, Spearman's rho(two-tailed)=.34, p<.0001, respectively), linguistic ability-Greek (Spearman's rho(two-tailed)=.30, p<.0001, Pearson's r(two-tailed)=.34, p<.0001, Spearman's rho(two-tailed)=.24, p<.0001, respectively) and age (Spearman's rho(two-tailed)=.57, p<.0001, Pearson's r(two-tailed)=.61, p<.0001, Spearman's rho(two-tailed)=.30, p<.0001, respectively). ANCOVAs on the three EC composite scores, with language group as a between subjects factor, IQ, linguistic ability-Greek, age and SES as covariates revealed no significant differences between the two groups (F(1, 99)=0.70, p>.05, (F(1, 98)=.346, p>.05 and F(1, 98)=.074, p>.05, respectively).

3.2.2. Comparison 2

Participants: The three groups were matched for age by excluding all bilectal and all multilingual children who were older than 9 and younger than 6 years of age. This resulted in 44 bilectals (21 boys and 23 girls; ages 6.2–8.9, mean age 7.6, SD 0.9 years), 26 multilinguals (15 boys and 11 girls; ages 6.2–9, mean age 7.6, SD 0.89 years) and 25 monolinguals (15 boys and 10 girls; ages 6.2–9, mean age 7.4, SD 0.87 years) included in the analyses.

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[5] All correlations reported are based on the whole sample of children.

Demographic characteristics: The three groups did not differ for age (F(2, 92)=.696, p>.05), gender (F(2, 92)=.587, p>.05), or language comprehension-Greek (in CG for bilectals and multilinguals and in SMG for monolinguals; F(2, 90) =0.877, p>.05). However, there were significant differences for SES (F(2, 89)=9.622, p<.0001) and IQ (F(2, 92)=3.492, p<.01, partial η^2=.07). Planned contrasts revealed that multilinguals were of a higher SES than monolinguals (t(89)=2.04, p<.05) and that monolinguals were of a higher SES than bilectals (t(89)=-2.07, p<.05). For IQ, planned contrasts showed that multilinguals had a significantly higher IQ than monolinguals (t(92)=2.622, p<.05, r=.26) and bilectals did not differ from monolinguals (t(92)=1.221, p>.05, r=.13).

Expressive vocabulary: An ANCOVA with group as a between-subjects factor and SES, IQ, age and Greek language comprehension score as covariates showed a significant effect of group (F(2, 83)=39.48, p<.0001, *partial* η^2=.49). Planned contrasts showed that bilectals and multilinguals had a lower expressive vocabulary than monolinguals (t(83)=-2.512, p<.005, r=.37 and t(83)=-8.63, p<.005, r=.67, respectively).

Executive control: ANCOVAs on the three EC composite scores, with group as a between subjects factor, IQ, linguistic ability-Greek, age and SES as covariates revealed a significant effect of group only on the overall EC score (F(2, 85)=3.226, p=.045, *partial* η^2=.07, for WM: (F(2, 84)=2.074, p=.132 and for Inhibition: F(6, 82886.155)=1.224, p=.125). Planned contrasts revealed a significant multilingual advantage over monolinguals (t(85)=2.524, p<.05, r=.26) and a trend for a bilectal advantage (t(85)=1.650, p=.103, r=.18).

3.2.3. Comparison 3

A subset of bilectal children and all monolingual children were further administered the PPVT (bilectals in CG and monolinguals in SMG) as a measure of receptive vocabulary. Since the EC composite scores significantly correlated with linguistic ability in Greek (which was the language of testing for the BDST; see also Carlson & Meltzoff, 2008 for a similar finding) and the bilectal children were less proficient than monolinguals in measures of linguistic ability, this comparison allowed us to determine whether a robust bilectal advantage over monolinguals could be found when more stringently controlling for children's general linguistic performance in Greek.

Participants: 17 bilectal children (10 boys and 7 girls; ages 6.2–8.9, mean age 7.6, SD 0.9 years) and 25 monolingual children (15 boys and 10 girls; ages 6.2–9, mean age 7.4, SD 0.87 years) were included in the following analyses.

Demographic characteristics: The two groups did not differ for age (F(1, 40)=.753, p>.05), gender (F(1,40)=.006, p>.05), language comprehension-Greek (F(1,40)=0.142, p>.05), IQ (F(1,40)=1.53, p<.05) or SES (F(1,38)=1.89, p<.05).

Receptive vocabulary: PPVT score significantly correlated only with age (r(two-tailed)=.55, p<.0001). An ANCOVA with group as a between subjects factor and age as a covariate showed a significant effect of group (F(1, 39)=11.20, p<.005, *partial* η^2=.22) indicating a monolingual advantage.

Executive control: An ANCOVA on the overall EC score, with group as a between-subjects factor, IQ, general linguistic ability-Greek and age as covariates revealed a significant effect of group (F(1, 34)=7.06, p<.05, r=.4) in that bilectals had a significantly higher EC score than monolinguals. Similar ANCOVAs on the WM and Inhibition scores revealed a significant effect of group on WM (F(1, 34)=6.666, p<.05, r=.4) and a marginally significant effect of group on Inhibition F(1, 34)=2.162, p=.15, r=.24). This pattern of results suggests that the bilectal advantage is more robust for WM than for Inhibition.

4. Discussion

The purpose of this study was to examine how bilectal children's linguistic and cognitive performance compares to that of multilinguals and monolinguals.

With regards to vocabulary size in Greek we found that bilectal children performed somewhere in between the other two groups: they were better than multilinguals in comparison 1 but worse than monolinguals in comparison 2 (expressive vocabulary) and 3 (receptive vocabulary). This might seem as an expected finding given experimental evidence showing that vocabulary development is related to amount of exposure to a specific language: multilinguals had the least amount of exposure to the Greek language (given that their input was divided between the two Greek varieties, English and in some cases another language), monolinguals the most, with bilectals somewhere in between. However, while this account explains the differences between multilinguals and monolinguals for expressive vocabulary and between bilectals and monolinguals for receptive vocabulary, it is not so appealing in explaining the differences between bilectal and monolingual children in expressive vocabulary. This is because, for bilectals in this test, words from both varieties were accepted as correct and therefore, their score indicated total expressive vocabulary. Thus given some evidence from the bilingualism literature that when considering total vocabulary bilinguals and monolinguals perform comparably (see e.g. Oller & Eilers 2002), bilectal and monolingual children should have shown comparable expressive vocabularies in this study as well.

There are two points we can make regarding this issue. First, differences in total vocabulary between monolingual and bilingual children are not without precedent. Indeed, a study by Yan & Nicoladis (2009) showed that 6- to 10-year-old bilingual children produced fewer words than monolinguals in an expressive vocabulary test, even when both of their languages where combined. Second, it has been argued by the same researchers that expressive vocabulary measures might impose a greater cognitive load in bilinguals than in monolinguals: bilinguals have less experience in using a word in each of their languages and thus might find it harder to retrieve that word. Furthermore, bilinguals might experience competition between words from their different languages which again might make the process of producing the target word more effortful. Similar considerations potentially apply for bilectal children's lexical access.

With regards to EC, consistent with previous studies, we found that multilingual children outperformed their monolingual peers in their EC skills. This advantage was obtained for overall EC performance and could not be attributed to a specific EC component. This finding provides support to recent views that have taken a more holistic approach in explaining performance differences between bilinguals and monolinguals in EC tasks and that attribute the bilingual advantage to an enhanced ability to coordinate or jointly recruit the various EC processes rather than to an isolated EC component (see Bialystok 2011). More importantly, however, this study further established that similar cognitive advantages obtain for bilectal children (although only when more carefully controlling for differences with monolinguals in formal language proficiency and perhaps to a lesser extent than multilinguals).

The contribution of the findings on EC in combination is particularly important for the experimental literature on the cognitive outcomes of bilingualism. First, they show that the reported beneficial effects of bilingualism in EC cannot be attributed to factors other than bilingualism, such as biculturalism, ethnicity or SES. Bilectal and monolingual children in this study came from two countries that have few if any differences in ethnic and cultural identity and still showed differences in their cognitive performance. Moreover, SES was assiduously assessed through several measures and regressed out in all analyses. Second, they reveal that cognitive advantages can be accrued even when speaking two minimally distant and closely related languages (or varieties in this case). We take this finding to suggest that bilectal children develop more like bi- than multilinguals, supporting an idea of *comparative bilingualism* that takes into consideration the language proximity (Grohmann, to appear).

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