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The Interplay of Two Different Language Acquisition Settings: How Children's Use of Multiple Languages at Home and at School Can Influence Attentional Processes

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Abstract

Language comprehension and production rely upon Executive Functions (EFs) to control and/or monitor speech. In this study we investigate, through the Attentional Network Test, how an instructed or natural setting of language acquisition in a multilingual environment and the interplay between these two settings can impact the development of attentional processes in a group of bi-/multilingual children (n = 165) developing in linguistically different interactional contexts. RT, accuracy and three attentional network measures were considered for data analyses and the association between attentional network measures, type of natural language context and the instructed setting of language acquisition were tested. Results showed that the children attending monolingual school programs with a high number of L2 hours and the children attending trilingual programs show overall faster reaction times (RTs). Furthermore, it was shown that the instructed setting at school combined with the natural setting at home, and the interplay between the two settings can crucially determine the effects of the bi-/multilingual interactional profile on attentional processes. This study highlights that an in-depth analysis of the impact and interplay of two different language acquisition settings can provide significant insight into bi-/multilingual children's cognitive development.

Keywords

Bilingualism, Multilingualism, Attentional Process, Language Acquisition, Interactional Context

1. Introduction

In the last couple of decades, globalization has brought together an increasing number of people from different cultures and socio-linguistic contexts. It has therefore become rather easy to receive input from several languages and to speak and memorize two or more linguistic codes instead of just one.

The linguistic environment is a determinant factor for language acquisition of both monolingual (Hart & Risley, 1995) and bilingual (Pearson et al., 1997) children. A bi-/multilingual environment is generally characterized by a naturalistic, spontaneous, uninstructed, unguided, untutored, and informal context, as may be at home, and by an instructed, guided, tutored, and formal context, which extends the linguistic environment to social interactions with other children and teachers, as may happen at school (for a review, see Housen & Pierrard, 2005).

An appropriate analysis of the bi- and multilingual language learning in developmental stages should necessarily take into account the number of languages, the single- or mixed-language context a person lives in (Wu & Thierry, 2013), the cultural background (Barac & Bialystok, 2012), implicit or explicit language learning strategies (Paradis, 2004; Ullman, 2001) in both the naturalistic and instructed contexts of the linguistic environment. Some attempts have also been made to compare a natural setting of language acquisition with an instructed one on the basis of language production through measurable variables such as the detection of an explicit linguistic output (e.g. vocabulary or grammar tests), language fluency, or proficiency (for a review, see Ellis, 1985, 1990; Norris & Ortega, 2000).

However, we argue that the elements characterizing a prolonged interactional context at home or at school, where two or more languages characterize interactions in an interchangeable manner, may not only likely act upon children's linguistic skills, but are somehow also tied to attentional processes supporting languages acquisition. We refer here to attentional processes as a set of specific mental processes (Miyake et al., 2000; Diamond, 2013; Desideri & Bonifacci, 2018) that develop rapidly during early school age directed towards adjusting children's behavior to different circumstances (Davidson et al., 2006), that in a bi-/multilingual child translates into monitoring different linguistic elements in a naturalistic or instructed interactional context populated by two or more languages.

In this regard, recent studies have reported consistent effects of bi-/multilingualism on attentional abilities in childhood (Barac & Bialystok, 2012; Poarch & van Hell, 2012; Videsott et al., 2012; Crivello et al., 2016), also evident on specific attentional processes, such as selective and sustained attention (Blom et al., 2017; Engel de Abreu et al., 2012; Krizman et al., 2012).

There is major consensus that attentional abilities develop throughout childhood (Best & Miller, 2010), thus it is likely to suppose that the bi-/multilingual context facets of the linguistic environment will exert major effects on attention-

al processes subserving language acquisition rather early in life (Bialystok, Martin, & Viswanathan, 2005). For this reason, we expected that if attentional abilities are shaped during childhood, they will likely build on language acquisition occurring in a naturalistic and instructed context and be mirrored by the bi-/multilingual nature of the linguistic environment. Namely, bi-/multilingual environments are populated by many different linguistic units, arising in different contexts during language acquisition, and attentional abilities are taxed upon, to monitor and select units pertaining to each language for successful communication.

Bi-/multilingual linguistic contexts can be studied best in a region with a population that is homogeneous, shares a similar socioeconomic background, and is approximately the same age. Ideally, a bi-/multilingual children sample with these characteristics would differ only in terms of whether they use one, two, or more languages, and in their use of these languages at home or in school.

Such a situation is given in the northern region of Italy (e.g. Trentino Alto-Adige/Südtirol) where a German (69.5%), Italian (26%), and Ladin, a romance minority language (4.5%) speaking population coexists (see ASTAT, 2011). Namely, the difference resides in the different types of bi- or multilingual interactional contexts in which these children develop, defined as the number of languages used at home (i.e. one, two, or more languages), and the amount of different languages of instruction in school (bi- or trilingual school programs), taking into consideration the dominant language of the immediate surroundings. These two acquisition contexts, at home or in school, can both vary in quantitative terms, depending on the number of languages in use and the amount of time spent using them and in qualitative terms depending on the type of parent-child interaction (i.e. at home) and the educational program (i.e. at school).

2. Aims of Study

The Adaptive Control Hypothesis (ACH) (Green & Abutalebi, 2013) focuses on how the interplay between bilingual language use and executive functions, including attentional processes, can change depending on the interactional contexts (Grundy, 2020). In accordance with ACH, we hypothesize that, for bilingual children, different interactional configurations necessarily build on a bi-/multilingual interactional skeleton consisting of core elements from home and school contexts throughout development. The identifying features of each context progressively add on to the child's cognitive body of language and executive functions shaping a so-called "bi-/multilingual interactional profile".

Namely, on the one hand, while children are at home, they may be exposed to different degrees to two or more languages. Thus, bi-/multilingual language acquisition and use at home will depend on a natural setting characterized by the parents (and other family members) interactions among themselves and with the child, tracing the thicker lines of the interactional context at home (henceforward NatSLA). On the other hand, when children start school, they are exposed

to one or more languages depending on the educational program. Therefore, the frequency of exposure and use of the languages will progressively delineate the fine lines of the interactional context at school (henceforward InstrSLA).

Thus, the present study aimed to investigate if bi-/multilingual interactional profiles, from different home and school contexts, influence task performance measures tapping into different attentional processes.

For this purpose, we used the Attentional Network Test (ANT) (Costa et al., 2008) which is designed to measure three attentional processes: alerting, spatial orientation, and conflict resolution (Fan et al., 2002, 2005; Costa et al., 2008).

Alerting refers to the capacity to hold a state of preparedness for increasing cognitive load of information processing (Posner & Raichle, 1994). Spatial orientation refers instead to the capacity to disengage and shift away from one stimulus and reengage the focus of attention on a different stimulus. Conflict resolution refers to the ability to monitor information, adapt and switch behaviour to pursue a required objective, by gating or overruling information interfering with task demands (Botvinick et al., 2001; Kan et al., 2013).

Thus, the aims of the present study were:

1) To investigate whether the quantity of instruction-based L2 (and L3) learning in different instructed settings can impact on ANT global performance measures (i.e. reaction times and accuracy) and predict the variability in measures of specific attentional processes; since the study was carried out in a multilingual region where different school programs coexist (in Italian, German, and Ladin), the school contexts ranged from a) predominantly monolingual school programs with a low amount of L2 instruction; b) predominantly monolingual programs with a high amount of L2 instruction; c) trilingual school programs for the Ladin minority.

2) To establish if the type of natural setting may be associated with variability in the measures for the three attentional processes and if an association exists between the overlap of similarity between a natural and an instructed setting of language acquisition and measures of specific attentional processes.

3. Materials and Methods

3.1. Participants

In this study, 165 children (mean age: 10.04 ± 0.33 years; min-max: 9 - 12 years; 87 females) were recruited. All children grew up in the Autonomous Region of Trentino Alto-Adige/Südtirol in Italy and share a similar socioeconomic background. All children attended elementary school and were in 4th grade at the time of the study. We selected seven schools with three school programs with a different InstrSLA in terms of the amount of instruction-based learning in L1, L2, and L3 (see **Table 1**). Type I schools represent a predominantly monolingual school program with up to 5 hours of L2 instruction per week. Type II schools represent a predominantly monolingual program with 6 to 13 hours of L2 instruction per week. In addition, Type I and Type II schools were further classified

Table 1. Sample distribution split by interactional contexts at school and at home.

SCHOOL CONTEXT									
A. School program Type I: 5 or less hours of L2 instruction N = 51 (29 F; 22 M)				B. School program Type II: 6 or more hours of L2 instruction N = 75 (40 F; 35 M)				C. School program Type III: balanced instruction—1/2 L2 and 1/2 L3 and L1 as vehicular N = 39 (18 F; 21 M)	
LINGUISTIC CONTEXT—Prevalence									
A.1 ITA N = 33 (17 F; 16 M)		A.2 GER N = 16 (11 F; 5 M)		B.1 ITA N = 54 (31 F; 23 M)		B.2 GER N = 21 (9 F; 12 M)		C.1 LAD N = 39 (18 F; 21 M)	
FAMILY CONTEXT									
A.1.1 MONO N = 26 (13 F; 13 M) ITA: 20 GER: 1 OTH: 5	A.1.2 BIL N = 7 (4 F; 3 M)	A.2.1 MONO N = 14 (8 F; 6 M) ITA: 0 GER: 14 OTH: 0	A.2.2 BIL N = 2 (1 F; 1 M)	B.1.1 MONO N = 36 (22 F; 14 M) ITA: 23 GER: 0 OTH: 2	B.1.2 BIL N = 16 (8 F; 8 M)	B.2.1 MONO N = 14 (7 F; 7 M) ITA: 1 GER: 10 OTH: 3	B.2.2 BIL N = 7 (2 F; 5 M)	C.1.1 MONO N = 21 (11 F; 10 M) LAD: 15 ITA: 1 GER: 3 OTH: 2	C.1.2 BIL N = 16 (6 F; 10 M)

N = Number of Participants; F = Female; M = Male; MONO = Monolingual; BIL = Bilingual; GER = German; ITA = Italian; LAD = Ladin; OTH = Other. B. N Total = 165 (87 Females (F); 78 Males (M)).

on the basis of the predominant context language (i.e.: a predominantly monolingual Italian school context with German as L2 or a predominantly monolingual German school context with Italian as L2). Type III schools. schools implement a very specific, balanced, trilingual school program with an immersive (CLIL-Content and Language Integrated Learning) approach in two languages (L2 and L3) where the L1 (Ladin) of most of the children mainly represents the vehicular language used at school, while it is used as the instruction language for only 2 hours per week.

In addition, a questionnaire was developed to assess the NatSLA at home of each child as either monolingual or bilingual. We ascertained 1) whether both parents shared the same L1; 2) whether the L1 was German, Italian, Ladin, or other; 3) the amount of time the children used and were exposed to each language; 4) the degree of overlap between the home language context and school's predominant language context (i.e., both parents or only one parent speaking the same language as the school predominant language context). Children speaking languages other than those characterizing the traditional socio-linguistic context of the Region of Trentino Alto-Adige (i.e., Ladin, German, and Italian) were not included in the final sample of 165 children for the aims of the study. All participants' parents provided informed consent prior to the study and the local ethics committee approved the present study, in compliance with the Helsinki Declaration.

3.2. Attentional Network Test

The Attentional Network Task (ANT) (Videsott et al., 2012) requires participants to respond to the direction of a central target arrow (left: ←; right: →) flanked by four other arrows or four horizontal lines. The ANT, in this context, includes four cue conditions (No Cue, Center Cue, Double Cue, and Spatial Cue) with three target conditions (Congruent, Incongruent, and Neutral). The entire array of arrows appeared either above or below a fixation cross and could be preceded or not by one of three cues (Center Cue, Double Cue, and Spatial Cue) (Videsott et al., 2012).

Reaction times (RT) and accuracy rates were collected. Participants were instructed to concentrate on the fixation cross and to pay attention to the central arrow (target stimuli). The task consisted of pressing as quickly and accurately as possible the left or right key on the computer mouse, according to the direction of the target arrow. Children were only tested once, individually, and in a separate room.

3.3. Data Analyses

Both RT and accuracy were considered for data analyses. In addition, for RT data, we computed measures of performance related to three attentional networks: 1) the Alerting Effect (AE); 2) the Orienting Effect (OE); 3) the Conflict Effect (CE).

First, in order to assess the influence of the quantity of instruction-based L2 (and L3) learning in different InstrSLA, RT and accuracy scores (for correct responses only) were entered in a 4 × 3 × 3 ANOVA on ANT data, with two internal factors, namely Cue Type with four levels (No Cue, Central Cue, Double Cue, Spatial Cue) and Flanker Type with three levels (Congruent, Incongruent, and Neutral), and a between-subjects factor "InstrSLA" with three levels (Type I, II, III school programs). For the purpose of this study, we were only interested in the main effect of the InstrSLA and the interaction "Flanker Type × InstrSLA".

Furthermore, we carried out three separate Multiple Regression (MR) analyses for AE, OE, and CE for each predominant school context language (i.e., German and Italian) in order to investigate if the different Types of school programs can significantly predict variability for each of the three ANT effects for the German or the Italian school context. The Type I school program was set as the baseline context, and we assessed if Type II and Type III differed significantly with respect to the baseline when entered separately in the regression model in terms of predicting variability observed for each of the three attentional networks.

Second, we carried out point-biserial correlations to investigate if the scores on each of the three attentional processes could be associated to the type of language context defined operationally as:

1) The type of Family home language context (i.e., among Ladin, German, and Italian language contexts) coded as 0 (i.e., if both parents share the same L1) and 1 (i.e., if the parents do not share the same L1);

2) The degree of overlap between home language context and school predominant language context (i.e., both parents not speaking the same language as the school predominant language context) coded as 0 (i.e., no overlap), 1 (i.e., one parent speaking the same language as the school predominant language context) and 2 (i.e., both parents speaking the same language as the school predominant language context).

4. Results

4.1. InstrSLA in the School Context and Global ANT Performance

The 4 × 3 × 3 ANOVA aimed at investigating ANT performance differences between the InstrSLA in the school contexts shows that there is a significant main effect of school context ($F(2, 162) = 6.175$; $p = 0.003$) for RT data and no significant main effect for accuracy data ($F(2, 162) = 1.305$; $p = 0.274$). Tukey Post tests revealed that Type I schools show slower reaction times overall than Type II ($p = 0.002$) (68.18 msecs and Type III ($p = 0.040$) (57.42 msecs) schools. However, there was no significant difference between Type II and Type III schools ($p = 0.874$) (see Figure 1).

An additional 4 × 3 × 7 ANOVA on RT data was implemented with the different schools (n = 7) as between-subjects factor to check for potential influences of classes of pupils pertaining to the same InstrSLA, although coming from different schools. The main effect of school showed a trend for significance ($F(6, 158) = 2.035$; $p = 0.064$), however Tukey post-hoc comparisons adjusted for multiple comparisons revealed no significant difference between schools ($p = 0.326$).

Only children enrolled in Type II ($p = 0.002$), but not in Type III ($p = 0.874$) schools showed significantly faster RT than those in Type I. We therefore carried out an additional analysis in order to investigate whether there is a different effect between Type I and Type II schools on the basis of the predominant school

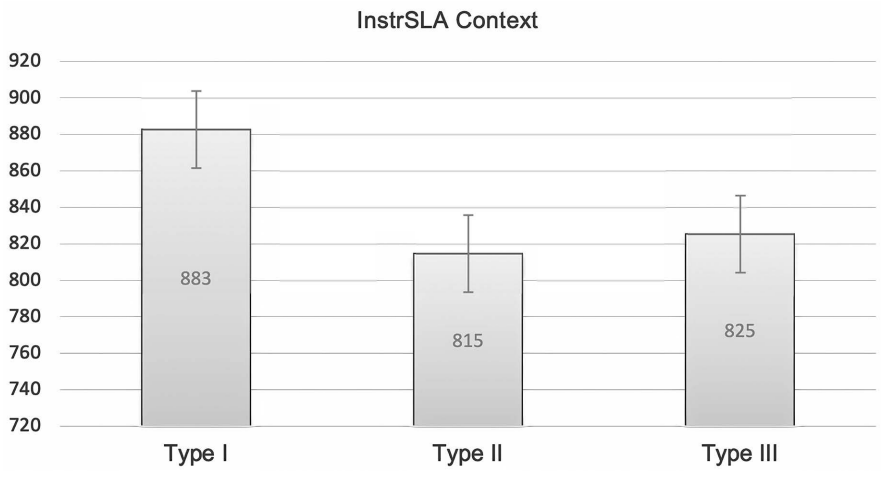


Figure 1. Mean RTs of the participants subdivided by the InstrSLA for Type I, II and III school contexts.

language context (i.e., German or Italian). A 4 × 3 × (2 × 2) ANOVA on RTs data was developed with two internal factors, i.e. Cue Type with four levels (No Cue, Central Cue, Double Cue, Spatial Cue) and Flanker Type with three levels (Congruent, Incongruent, and Neutral) and an interaction between-subjects term "InstrSLA" (i.e., Type I and Type II) * "predominant school language context" (i.e., German or Italian). A significant main effect of the between-subjects interaction term "InstrSLA × predominant school language context" ($F(3, 122) = 3.538$; $p = 0.017$) was present, in the sense that RTs were overall faster for children in Type II school programs irrespective of their predominant school language context (i.e., German or Italian) (see Figure 2).

4.2. InstrSLA in the School Context and Specific Attentional Processes

For the Alerting Effect (AE), the regression model significantly predicted AE measures in the German school context ($F(2, 73) = 5.135$; $p = 0.008$). The unstandardized beta for Type II school programs reached significance ($p = 0.002$), but not for Type III school programs ($p = 0.136$), in the sense that for Type II school programs, a significant AE increase (B = 50.70 msecs) is observed with respect to the baseline context (Type I school programs), In the Italian school context, the regression model was not significant ($F(2, 125) = 0.477$; $p = 0.622$).

For the Orienting Effect (OE), in the German school context, the regression model failed to reach significance ($F(2, 73) = 0.674$; $p = 0.513$), while in the Italian school context the regression model ($F(2, 125) = 3.075$; $p = 0.050$) was significant, in the sense that Type II programs (B = 26.53 msecs; $p = 0.043$) but not Type III (B = 0.98 msecs; $p = 0.994$), significantly predict an increase in the orienting effect with respect to the baseline context (Type I school programs).

For the Conflict Effect (CE), the regression model was not significant in either the German ($F(2, 125) = 0.146$; $p = 0.864$) or the Italian school context ($F(2, 125) = 0.374$; $p = 0.689$)).

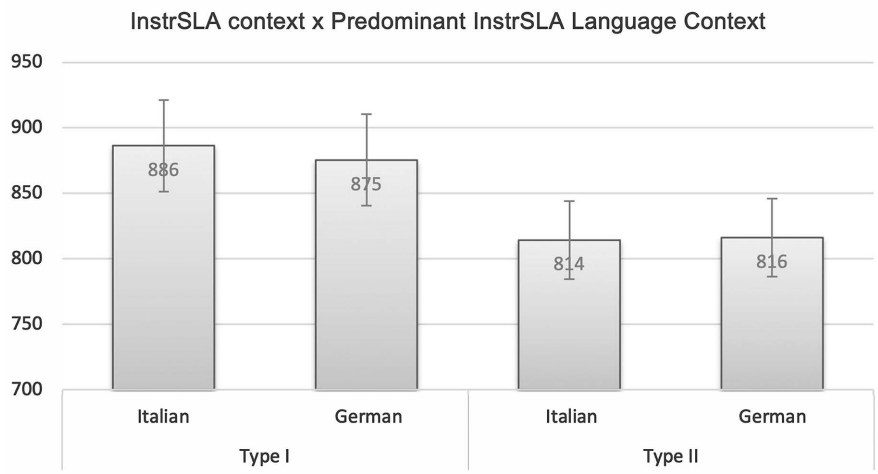


Figure 2. Mean RTs of the pupils subdivided by Type I or II of the InstrSLA school context and predominant language context (i.e. Italian or German).

4.3. NatSLA at Home, InstrSLA at School and Specific Attentional Processes

Significant correlations were only found between:

1) The type of Family NatSLA in the home context and the Alerting Effect (r = 0.179; $p = 0.039$), meaning that family contexts in which parents speak different languages are associated with a greater Alerting Effect;

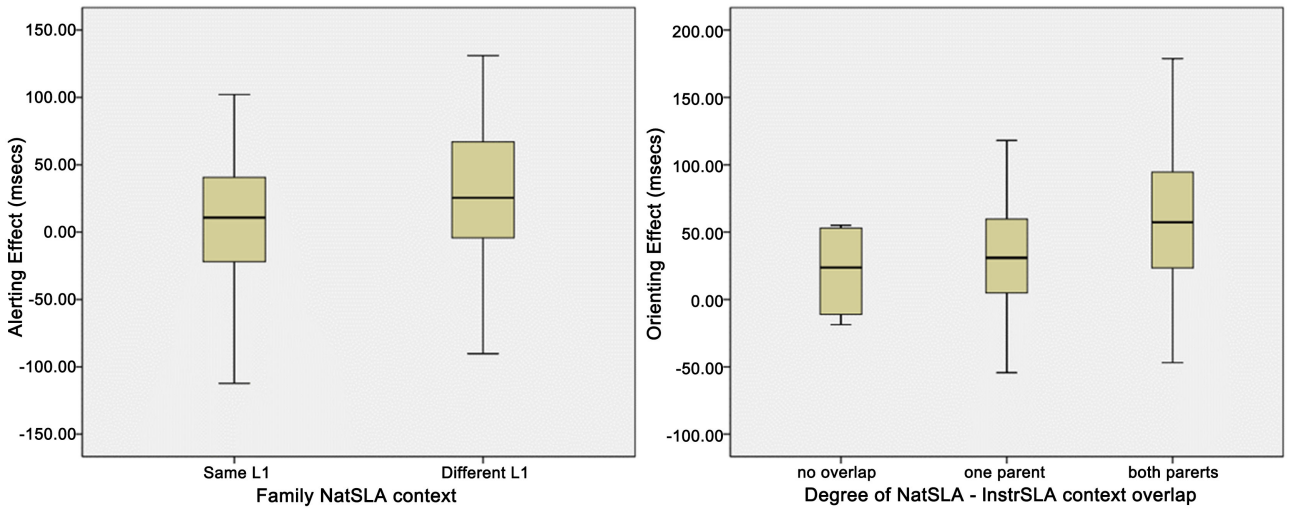
2) The variable coding the degree of overlap between the NatSLA, in the home context, and the predominant language of the InstrSLA, in the school context, and the Orienting Effect, meaning that a higher degree of overlap between each parents dominant language and predominant language context in the school is associated with a greater Orienting Effect (r = 0.235; $p = 0.006$) (see **Figure 3**).

5. Discussion

The aim of this study was to investigate if the bi-/multilingual interactional profile set by the characteristics of the type of context where the languages are mainly acquired, at home (i.e., natural setting of language acquisition) or at school (i.e., instructed setting of language acquisition) can somehow contribute to defining the extent to which the capacity to speak two or more languages shapes performance differences driven by different attentional processes.

For this purpose, we asked 165 bi- or multilingual children attending linguistically different school programs to perform the Attentional Network Test (ANT) (Videsott et al., 2012).

First, we aimed at verifying whether the amount of instruction-based L2 (and L3) learning in different instructed settings of language acquisition in school contexts can influence the global ANT performance. The instructed settings ranged from



(a) (b)

Figure 3. Box plots showing (a) the relationship between the type of family NatSLA in the home context (i.e., parents with same or different L1) (x-axis) and AE measures (y-axis) (left); (b) the relationship between the degree of the NatSLA in the home context-predominant language of the InstrSLA in the school context overlap (i.e., no overlap, one parent-medium overlap, two parents-high overlap) (x-axis) and the OE measures.

1) Predominantly monolingual school programs with a low amount of L2 instruction (Type I);

2) Predominantly monolingual programs with a high amount of L2 instruction (Type II);

3) Trilingual school programs with an immersive approach in two languages (L2 and L3) where L1 figures almost exclusively as the vehicular language (Type III).

Results highlighted that children attending Type II and III school programs showed faster overall RTs on the ANT compared to those attending a Type I school program with fewer hours of L2 instruction. Furthermore, this pattern did not seem to be influenced by school types or by the dominant language of the children's everyday surroundings. Importantly, no differences emerged for Type III program with respect to Type II, meaning that increasing both the amount of L2 instruction (i.e., number of hours) and the number of languages (i.e., adding an L3) does not seem to coincide with an overall performance boost on the ANT.

In line with this result, Poarch and van Hell (2012) observed no significant differences for performance on both the Simon and ANT between bilinguals and trilinguals, suggesting that managing and selecting among lexical candidates in three languages instead of two on a daily basis does not boost attentional control processes. Therefore, it appears that in the instructed setting, the number of hours taught in another language, rather than the number of different languages, exerts a decisive influence on overall attentional measures.

Thus, the present findings suggest that the number of hours spent in a formal instructed setting of language acquisition, like the school context, has an influence on the development of attentional processes for children in Type II school programs. Noteworthy, in our study all children had spent a 4 to 5-year period in their respective school programs. This is in line with Barac and Bialystok (2012) evidence, showing that executive control performance improves with increased experience in a bilingual education environment and with the idea that attentional control processes respond to accumulating experience (Bialystok, 1993, 2001, 2011, 2015). Hence, only an extensive, constant, and accumulating bi-/multilingual experience in an instructed setting can exert influence over an extra-linguistic cognitive mechanism, entailing attentional processing.

Second, we investigated whether the type of instructed setting and school program can influence alerting, orienting, and executive control attentional measures depending on the predominant language in each school context (i.e., German and Italian).

Surprisingly, we found a dissociation in terms of predominant language in each school context. Specifically, children raised in a predominantly German context (where Italian is an L2) in Type II school programs showed a significantly higher alerting effect (50.70 msec), while those growing up in a predominantly Italian context (where German is an L2), in the same Type II school pro-

gram, showed instead a significantly greater orienting effect (26.51 msec).

Previous research on bilingual and trilingual children also highlighted beneficial effects on the alerting (Videsott et al., 2012) and the orienting network (Poarch & van Hell, 2012).

Research in the field of second language learning has demonstrated that attentional processes are critical in order to reach high levels of language fluency. Once second language mastery reaches a certain degree, it seems that attention to specific elements of a language can influence the learning process itself. White et al. (2012) have shown, for example, that extensive training on specific aspects of a language is paralleled with an increased ability to detect errors during language production, which contributes in turn to the emergence of more general language competence (Swain & Lapkin, 1995).

In the current study, two predominant language contexts for the instructed setting of language acquisition were considered: German and Italian. These two languages provide an ideal combination, because speakers of both languages are part of the same cultural community found in the region where the study was set. At the same time, the language structures of German and Italian show important differences on all linguistic levels (phonological, morphological, syntactic, and also pragmatic) (Schmitz et al., 2012). This so-called cross-linguistic influence between languages has been widely examined in many other studies (Müller & Hulk, 2001; Serratrice et al., 2004) and could explain the dissociation we observed for alerting and orienting effects between the two predominant languages in each school context. Nevertheless, further studies need to be undertaken to investigate in greater detail how the German context, with Italian as L2, necessitates a higher state of readiness due to a higher complexity of Italian for some aspects, (Serratrice et al., 2004) or how, in the reverted learning scenario, the demands of German in the Italian context will tap more into orienting resources.

However, we suggest that regular exposure to Italian or German in an extensive instructed setting of language acquisition in a specific school program affects different attentional processes guided by similar strategies used by bilinguals to segment linguistic stimuli into lexical units based on their dominant language (Dupoux et al., 2001) or context-appropriate languages (de la Cruz-Pavía et al., 2015).

Third, we assessed whether the quality of the natural setting of language acquisition at home (i.e. the level of homogeneity of the bi- or multilingual family composition in terms of language background and use) could somehow be related to the effect of bi-/multilingualism on attentional processes. It emerged that a family context in which the two parents speak different languages has a significant influence over alerting processes. Mishra and Singh (2014) demonstrated that language activation is non-selective in bilinguals, as they immediately activate word meaning while listening to lexical forms in either one of their languages, notwithstanding the degree of script or phonology overlap.

Therefore, if bi-/multilinguals regularly exercise their bi-/multilingualism in a discourse where the language of the interlocutor changes, also in the same context, this could raise levels of preparedness to a higher degree due to cross-linguistic activation.

Furthermore, we examined whether the degree of overlap between the bi- or multilingual composition of natural and instructed settings exerts a greater influence over the relationship between bi-/multilingualism and attention. We found that a higher degree of overlap between each parent's dominant language and school predominant language context is associated with a greater orienting effect.

The latter findings are consistent with the ACH (Green & Abutalebi, 2013) according to which the bilingual language control system can be taxed to a different extent by language processing demands. Such interplay, in turn, adaptively shapes attentional control processes depending upon the specific features of conversational demands triggered by the interactional context. In our case, when the home and the school interactional contexts coincide, the overlap between linguistic cues and discourse elements selectively heeds the same global bi-/multilingual experiential cues. Such convergence enhances the ability to shift and engage attention to linguistic and pragmatic saliencies of either language.

Furthermore, a person who uses a specific language selects objects which the language refers to by anticipation and prediction (Altmann & Kamide, 2007). Anticipation drives quick orientation of attention in space where the target object is predicted to be found, thus if the two interactional contexts overlap, anticipation of the same language-specific saliencies built in each context will enhance the engagement of attention to language-specific elements predicted by on-hand communicational demands.

6. Conclusion

We put forward the hypothesis that when bilinguals consciously decide which language they will select in a conversation, this decision is subtended by a task schema (Green, 1998) which is explicitly or more implicitly cued by the language of the interlocutor, the situation, the predominant language of the context, and other socio-linguistic and cultural factors (Green & Abutalebi, 2013). Thus, it may result that the exclusive tie between bi-/multilingualism and attention results from the development of a robust task schema (Dijksterhuis & Nordgren, 2006), which is forged and strengthened by the overlap between the nature of bi-/multilingual interactional contexts and the convergence towards bi-/multilingual experiential cues shared between different interactional contexts.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

Altmann, G. T. M., & Kamide, Y. (2007). The Real-Time Mediation of Visual Attention by Language and World Knowledge: Linking Anticipatory (and Other) Eye Movements to Linguistic Processing. *Journal of Memory and Language, 57,* 502-518. https://doi.org/10.1016/j.jml.2006.12.004

ASTAT (2011). http://www.provincia.bz.it/astat/it/popolazione/458.asp?News_action=4&News_article_id=396331

Barac, R., & Bialystok, E. (2012). Bilingual Effects on Cognitive and Linguistic Development: Role of Language, Cultural Background, and Education. *Child Development, 83,* 413-422. https://doi.org/10.1111/j.1467-8624.2011.01707.x

Best, J. R., & Miller, P. H. (2010). A Developmental Perspective on Executive Function. *Child Development, 81,* 1641-1660. https://doi.org/10.1111/j.1467-8624.2010.01499.x

Bialystok, E. (1993). Metalinguistic Awareness: The Development of Children's Representations of Language. In C. Pratt, & A. Garton (Eds.) *Systems of Representation in Children: Development and Use* (pp. 211-233). John Wiley & Sons.

Bialystok, E. (2001). *Bilingualism in Development: Language, Literacy, and Cognition*. Cambridge University Press. https://doi.org/10.1017/CBO9780511605963

Bialystok, E. (2011). Coordination of Executive Functions in Monolingual and Bilingual Children. *Journal of Experimental Child Psychology, 110,* 461-468. https://doi.org/10.1016/j.jecp.2011.05.005

Bialystok, E. (2015). Bilingualism and the Development of Executive Function: The Role of Attention. *Child Development Perspectives, 9,* 117-121. https://doi.org/10.1111/cdep.12116

Bialystok, E., Martin, M. M., & Viswanathan, M. (2005). Bilingualism across the Lifespan: The Rise and Fall of Inhibitory Control. *International Journal of Bilingualism, 9,* 103-119. https://doi.org/10.1177/13670069050090010701

Blom, E., Boerma, T., Bosma, E., Cornips, L., & Everaert, E. (2017). Cognitive Advantages of Bilingual Children in Different Sociolinguistic Contexts. *Frontiers in Psychology, 8,* Article 552. https://doi.org/10.3389/fpsyg.2017.00552

Botvinick, M. M., Braver, T. S., Barch, D. M., Carter, C. S., & Cohen, J. D. (2001). Conflict Monitoring and Cognitive Control. *Psychological Review, 108,* 624-652. https://doi.org/10.1037/0033-295X.108.3.624

Costa, A., Hernández, M., & Sebastián-Gallés, N. (2008). Bilingualism Aids Conflict Resolution: Evidence from the ANT Task. *Cognition, 106,* 59-86. https://doi.org/10.1016/j.cognition.2006.12.013

Crivello, C., Kuzyk, O., Rodrigues, M., Friend, M., Zesiger, P., & Poulin-Dubois, D. (2016). The Effects of Bilingual Growth on Toddlers' Executive Function. *Journal of Experimental Child Psychology, 141,* 121-132. https://doi.org/10.1016/j.jecp.2015.08.004

Davidson, M. C., Amso, D., Anderson, L. C., & Diamond, A. (2006). Development of Cognitive Control and Executive Functions from 4 to 13 Years: Evidence from Manipulations of Memory, Inhibition, and Task Switching. *Neuropsychologia, 44,* 2037-2078. https://doi.org/10.1016/j.neuropsychologia.2006.02.006

de la Cruz-Pavía, I., Elordieta, G., Sebastián-Gallés, N., & Laka, I. (2015). On the Role of Frequency-Based Cues in the Segmentation Strategies of Adult OV-VO Bilinguals. *International Journal of Bilingual Education and Bilingualism, 18,* 225-241. https://doi.org/10.1080/13670050.2014.904839

Desideri, L., & Bonifacci, P. (2018). Verbal and Nonverbal Anticipatory Mechanisms in

Bilinguals. *Journal of Psycholinguistic Research, 47,* 719-739. https://doi.org/10.1007/s10936-017-9556-1

Diamond, A. (2013). Executive Functions. *Annual Review of Psychology, 64,* 135-168. https://doi.org/10.1146/annurev-psych-113011-143750

Dijksterhuis, A., & Nordgren, L. F. (2006). A Theory of Unconscious Thought. *Perspectives on Psychological Science: A Journal of the Association for Psychological Science, 1,* 95-109. https://doi.org/10.1111/j.1745-6916.2006.00007.x

Dupoux, E., Peperkamp, S., & Sebastián-Gallés, N. (2001). A Robust Method to Study Stress "Deafness". *The Journal of the Acoustical Society of America, 110,* 1606-1618. https://doi.org/10.1121/1.1380437

Ellis, R. (1985). *Understanding Second Language Acquisition*. Oxford University Press.

Ellis, R. (1990). *Instructed Second Language Acquisition: Learning in the Classroom*. Blackwell.

Engel de Abreu, P. M. J., Cruz-Santos, A., Tourinho, C. J., Martin, R., & Bialystok, E. (2012). Bilingualism Enriches the Poor: Enhanced Cognitive Control in Low-Income Minority Children. *Psychological Science, 23,* 1364-1371. https://doi.org/10.1177/0956797612443836

Fan, J., McCandliss, B. D., Fossella, J., Flombaum, J. I., & Posner, M. I. (2005). The Activation of Attentional Networks. *NeuroImage, 26,* 471-479. https://doi.org/10.1016/j.neuroimage.2005.02.004

Fan, J., McCandliss, B. D., Sommer, T., Raz, A., & Posner, M. I. (2002). Testing the Efficiency and Independence of Attentional Networks. *Journal of Cognitive Neuroscience, 14,* 340-347. https://doi.org/10.1162/089892902317361886

Green, D. W. (1998). Mental Control of the Bilingual Lexico-Semantic System. *Bilingualism: Language and Cognition, 1,* 67-81. https://doi.org/10.1017/S1366728998000133

Green, D. W., & Abutalebi, J. (2013). Language Control in Bilinguals: The Adaptive Control Hypothesis. *Journal of Cognitive Psychology, 25,* 515-530. https://doi.org/10.1080/20445911.2013.796377

Grundy, J. G. (2020). The Effects of Bilingualism on Executive Functions: An Updated Quantitative Analysis. *Journal of Cultural Cognitive Science, 4,* 177-199. https://doi.org/10.1007/s41809-020-00062-5

Hart, B., & Risley, T. R. (1995). *Meaningful Differences in the Everyday Experience of Young American Children*. Paul H. Brookes Publishing Company.

Housen, A., & Pierrard, M. (Eds.) (2005). *Investigations in Instructed Second Language Acquisition*. Mouton de Gruyter. https://doi.org/10.1515/9783110197372

Kan, I. P., Teubner-Rhodes, S., Drummey, A. B., Nutile, L., Krupa, L., & Novick, J. M. (2013). To Adapt or Not to Adapt: The Question of Domain-General Cognitive Control. *Cognition, 129,* 637-651. https://doi.org/10.1016/j.cognition.2013.09.001

Krizman, J., Marian, V., Shook, A., Skoe, E., & Kraus, N. (2012). Subcortical Encoding of Sound Is Enhanced in Bilinguals and Relates to Executive Function Advantages. *Proceedings of the National Academy of Sciences of the United States of America, 109,* 7877-7881. https://doi.org/10.1073/pnas.1201575109

Mishra, R. K., & Singh, S. (2014). Activation of Shape and Semantic Information during Ambiguous Homophone Processing: Eye Tracking Evidence from Hindi. *Cognitive Processing, 15,* 451-465. https://doi.org/10.1007/s10339-014-0622-4

Miyake, A., Friedman, N. P., Emerson, M. J., Witzki, A. H., Howerter, A., & Wager, T. D. (2000). The Unity and Diversity of Executive Functions and Their Contributions to Complex "Frontal Lobe" Tasks: A Latent Variable Analysis. *Cognitive Psychology, 41,*

49-100. https://doi.org/10.1006/cogp.1999.0734

Müller, N., & Hulk, A. (2001). Crosslinguistic Influence in Bilingual Language Acquisition: Italian and French as Recipient Languages. *Bilingualism: Language and Cognition, 4,* 1-21. https://doi.org/10.1017/S1366728901000116

Norris, J. M., & Ortega, L. (2000). Effectiveness of L2 Instruction: A Research Synthesis and Quantitative Meta-Analysis. *Language Learning, 50,* 417-528. https://doi.org/10.1111/0023-8333.00136

Paradis, M. (2004). *A Neurolinguistic Theory of Bilingualism* (Vol. 18). John Benjamins Publishing. https://doi.org/10.1075/sibil.18

Pearson, B., Fernandez, S., Lewedeg, V., & Oller, D. (1997). The Relation of Input Factors to Lexical Learning by Bilingual Infants. *Applied Psycholinguistics, 18,* 41-58. https://doi.org/10.1017/S0142716400009863

Poarch, G. J., & van Hell, J. G. (2012). Executive Functions and Inhibitory Control in Multilingual Children: Evidence from Second-Language Learners, Bilinguals, and Trilinguals. *Journal of Experimental Child Psychology, 113,* 535-551. https://doi.org/10.1016/j.jecp.2012.06.013

Posner, M. I., & Raichle, M. E. (1994). *Images of Mind* (pp. ix, 257). Scientific American Library/Scientific American Books.

Schmitz, K., Patuto, M., & Müller, N. (2012). The Null-Subject Parameter at the Interface between Syntax and Pragmatics: Evidence from Bilingual German-Italian, German-French and Italian-French Children. *First Language, 32,* 205-238. https://doi.org/10.1177/0142723711403880

Serratrice, L., Sorace, A., & Paoli, S. (2004). Crosslinguistic Influence at the Syntax-Pragmatics Interface: Subjects and Objects in English-Italian Bilingual and Monolingual Acquisition. *Bilingualism: Language and Cognition, 7,* 183-205. https://doi.org/10.1017/S1366728904001610

Swain, M., & Lapkin, S. (1995). Problems in Output and the Cognitive Processes They Generate: A Step towards Second Language Learning. *Applied Linguistics, 16,* 371-391. https://doi.org/10.1093/applin/16.3.371

Ullman, M. T. (2001). The Neural Basis of Lexicon and Grammar in First and Second Language: The Declarative/Procedural Model. *Bilingualism: Language and Cognition, 4,* 105-122. https://doi.org/10.1017/S1366728901000220

Videsott, G., Rosa, P. A. D., Wiater, W., Franceschini, R., & Abutalebi, J. (2012). How Does Linguistic Competence Enhance Cognitive Functions in Children? A Study in Multilingual Children with Different Linguistic Competences. *Bilingualism: Language and Cognition, 15,* 884-895. https://doi.org/10.1017/S1366728912000119

White, E. J., Genesee, F., & Steinhauer, K. (2012). Brain Responses before and after Intensive Second Language Learning: Proficiency Based Changes and First Language Background Effects in Adult Learners. *PLOS ONE, 7,* e52318. https://doi.org/10.1371/journal.pone.0052318

Wu, Y. J., & Thierry, G. (2013). Fast Modulation of Executive Function by Language Context in Bilinguals. *Journal of Neuroscience, 33,* 13533-13537. https://doi.org/10.1523/JNEUROSCI.4760-12.2013