Effects of Dominance in Exposure and Linguistic Distance in the Bilingual Proficiency Profiles of Dutch-German and Greek-German School-Age Bilinguals

JHLR

RESEARCH

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ABSTRACT

Bilingual development is characterized by systematic variability, so called profile effects. This paper investigates dominance in exposure and linguistic distance as potential sources of bilingual profile effects by comparing the lexical and narrative profiles of Greek-German bilinguals to those of Dutch-German bilinguals.

Both bilingual groups, aged 10–11 years, were recruited from bilingual school-contexts in Germany. The Greek-German bilinguals (N=15) constitute a classic heritage language population with a fairly distantly related language combination, the Dutch-German bilinguals (N=15) constitute an under-researched group of bilingual speakers with a very closely related language combination. Participants were asked about their language exposure and underwent a productive vocabulary task and a narrative production task in both languages.

Findings indicate that dominance in exposure did not directly translate into dominance in lexical proficiency, which might be related to a cognate facilitation effect in the lexical tasks for the Dutch-German bilinguals. The narrative analysis indicates that, on group-level, dominance in exposure translated into dominance in narrative performance. A correlational analysis showed that dominance affected narrative measures differently and correlated differently with narrative measures depending on the group and, thus, language combination. However, it could not be affirmed that the linguistic proximity of Dutch and German balanced out dominance effects in general, since dominance in that group of bilinguals was too stark.

It is concluded from this that dominance in exposure and linguistic distance interact in bilingual development, but that this relationship is also dependent on the magnitude of dominance and the type of task and linguistic domain under investigation.

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PROFILE EFFECTS IN BILINGUAL DEVELOPMENT

Bilingual development is characterized by higher degrees of variability than monolingual development (see e.g. Grosjean, 1998). Much of this variability is attributed to the 'complementarity principle', i.e., the fact that bilinguals divide their time differently between their two languages leading to differences in onset, degree and type of input and use of the two languages across bilingual populations and, thus, leading to different degrees of dominance (Grosjean, 1998, 2008). Research on bilingual development has made considerable advances in explaining the systematicity underlying this variability by identifying a number of relevant speaker-internal and external factors (see e.g. Paradis, 2011).

One fruitful line of investigation in this has been the investigation of imbalances of bilinguals' development across different language domains, so called bilingual profile effects (see e.g. Oller et al., 2007). The assumption underlying this route of investigation is that some linguistic domains are more vulnerable to factors affecting bilingual development than others leading to 'differential or asynchronous acquisition of the various language domains' (Chondrogianni & Marinis, 2011, p. 320). This, in turn, is attributed to the fact that bilingual children can share some components of their linguistic ability across their two languages more than others (see e.g. Francis, 2012; Oller et al., 2007; Paradis & Kirova, 2014). Chondrogianni and Marinis (2011) suggest that this partly depends on how generalizable and/or transferable a specific knowledge component is across the bilinguals' two languages.

Narrative productions lend themselves to the investigation of bilingual profile effects. As language use in context, they provide an ecological tool to investigate the development of a wide range of linguistic abilities and their integration with cognitive development (Bongartz & Torregrossa, 2017, 2021; Gagarina et al., 2012; Knopp, 2019). As such, they provide more naturalistic, detailed and nuanced information on bilingual proficiency development than isolated and highly-controlled measures, such as vocabulary scales (Gagarina et al., 2012).

A great number of studies have investigated profile effects in bilingual children's narrative productions across ages and language combinations (see e.g. Bongartz & Torregrossa, 2017; Gagarina, 2016; Iluz-Cohen & Armon-Lotem, 2013; Knopp, 2019; Paradis & Kirova, 2014; Pearson, 2002; Squires et al., 2014; Uccelli & Páez, 2007). Results indicate that bilinguals can share generalizable cognitive skills that underlie the macrostructural make up of stories more than microstructural skills, the latter of which are more vulnerable to dominance effects than the former (see e.g. Gagarina, 2016; Paradis & Kirova, 2014). However, a number of studies indicate that high degrees of dominance also affect bilinguals' macrostructural skills (see e.g. Gagarina, 2016; Squires et al., 2014; Uccelli & Páez, 2007). Since most of these studies focus on one bilingual language combination, effects of linguistic distance were not directly detectable. To our knowledge, Knopp (2019) is the only study that compared profile effects in narrative productions in both languages across different language combinations (i.e., Greek-German vs. Greek-English). Results indicate that differences and similarities between the bilinguals' two languages are 'crucial to understanding the profile effects' found in the bilinguals' narratives (Knopp, 2019, p. 325).

The present study pursues this line of research by comparing a subgroup of the Greek-German bilinguals reported on in Knopp (2019) to an age-matched group of Dutch-German bilinguals. Its aim is to understand how profile effects found in 10-year-old bilinguals are affected by language dominance and linguistic distance. In line with Knopp (2019), it is argued that dominance in exposure affects dominance in the bilinguals' proficiency profiles differently. The comparison of Dutch-German with Greek-German bilinguals will provide insights into how linguistic distance interacts with dominance in exposure. By comparing results from narrative productions with results from isolated productive vocabulary tests it will be shown that narrative tasks render a more nuanced picture of profile effects related to dominance in exposure and linguistic distance in bilingual development when compared to a single measure of productive vocabulary.

DOMINANCE IN BILINGUAL DEVELOPMENT

Few bilinguals are equally proficient and, thus, completely balanced in their languages (see e.g. Grosjean, 2008; Treffers-Daller, 2019). Most bilinguals develop their two languages to different degrees leading to a dominant and a weaker language. Despite the intuitive attraction of the

notion of bilingual language dominance, there is, so far, no consensus on its operationalization (Treffers-Daller, 2019). This is related to the fact that dominance is a multidimensional construct that encompasses not only language proficiency but also experiential dimensions, such as input and use (Montrul, 2015; Unsworth et al., 2018).

In many studies, dominance is operationalized as the 'relative strength of a bilingual's proficiency in each language' (Treffers-Daller, 2019, p. 379). However, proficiency in itself is multidimensional comprising of different domains (i.e., grammatical, lexical, phonological or pragmatic ability) and dimensions (i.e., knowledge vs. processing, Montrul, 2015). Yet, many studies operationalize dominance by focusing on one aspect of proficiency, namely vocabulary knowledge (Treffers-Daller, 2019). While this is a convenient and practical choice, since vocabulary is easy to test and tests are readily available for different languages and age-groups, such an approach cannot capture lexical proficiency, let alone proficiency as a whole (Montrul, 2015; Treffers-Daller, 2019). A further drawback of operationalizing dominance as relative proficiency relates to crosslinguistic comparability. Yip and Matthews (2006), for instance, show that mean length of utterance (MLU), a widely used measure in language development, is not always comparable across languages due to differences in the use of function words across languages. Similar observations were made by Knopp (2019) investigating the syntactic complexity of narratives produced by German-Greek bilinguals. The high frequencies of subordinate complement clauses in the Greek narratives were not related to dominance but rather to the specific syntax of modal constructions in Greek. In order to avoid such artifacts, international research initiatives have devised instruments that aim to measure and compare bilinguals' proficiency across languages, such as the LITMUS-test battery developed by COST action IS0804 project (Marinis & Armon-Lotem, 2015; Simonsen & Haman, 2017 among others).

One way to circumvent the above-described drawbacks is to use experiential-based measures to indirectly assess language dominance (Treffers-Daller, 2019; Unsworth et al., 2018). This follows the argument that dominance in language proficiency is a reflection of the complementarity principle. Since bilinguals use their two languages to different degrees and in different communicative contexts, they also develop them to different degrees of proficiency across linguistic domains (Treffers-Daller, 2019). Recent studies by Unsworth (2015) and Unsworth et al. (2018) indicate that measures of language input and use can, indeed, serve as a reliable proxy for language dominance in behavioral data of bilingual children, especially so, when based on fine-grained background questionnaires. This study follows this line of argument by operationalizing dominance as relative exposure to the bilinguals' two languages and then investigating how this dominance in exposure is reflected in dominance in proficiency across different linguistic domains, measured by a standardized vocabulary task and a narrative task. Following Unsworth (2013) a difference is being made between current language exposure (here referred to as Current Language Use, CLU) and cumulative language exposure (here referred to as Oral Language History, OLH). The rationale behind this differentiation is related to the fact that different aspects of language proficiency might be affected differently by past and present dominance in exposure.

LINGUISTIC DISTANCE

The second factor under investigation in this study is linguistic distance. Linguistic distance refers to the 'degree of similarity between languages' (Schepens et al., 2016, p. 4). In adult second language acquisition, there is little controversy that linguistic similarities between the learner's two languages can facilitate language learning (Odlin & Yu, 2016; Ringbom & Jarvis, 2009). There are also studies that show that this is the case for bilingual children (Barac & Bialystok, 2012). The more similar a bilinguals' two languages are, the more potential for transfer and crosslinguistic influence between the two systems there is (Ringbom & Jarvis, 2009).

The facilitative effects of linguistic similarities across bilinguals' languages have been predominantly investigated in the lexical domain. Bilinguals process cognates (i.e., lexical items that are similar across languages in form and meaning) faster and more accurately than non-cognates. This holds for adults and children and concerns second language learners as well as bilinguals (Bosma et al., 2019; Costa et al., 2000; Dijkstra et al., 1999; Rosselli et al., 2014 among others). Research indicates that this so-called 'cognate facilitation effect' affects both of the bilinguals' languages, but especially their weaker language (Rosselli et al., 2014, 2016). This can influence the outcome of productive and receptive vocabulary tasks, where bilinguals

recognize and/or produce cognates more accurately than non-cognates (Goriot et al., 2018; Lindgren & Bohnacker, 2020).

While studies on the cognate facilitation effect focus on linguistic similarity in the lexical domain, there is little consensus on how to best measure linguistic distance across domains (Grohmann & Kambanaros, 2016; Ringbom & Jarvis, 2009). Again, this is due to the multidimensionality of the concept that should include linguistic similarities on phonological, morphological, syntactic and lexical levels (Schepens et al., 2016). Consequently, most research on effects of linguistic distance in bilingualism has reverted to operationalizing language distance qualitatively on the basis of language-family relations, i.e., by comparing different groups of bilinguals whose languages are more or less closely related (e.g. Barac & Bialystok, 2012).[1]

This study follows such a comparative approach by contrasting two groups of bilinguals whose two languages are related to each other to different degrees on the basis of language family relations; namely a group of Dutch-German bilinguals, whose two languages, as West-Germanic languages, are very closely related and, thus, similar on lexical and structural level (Schepens et al., 2016), and a group of Greek-German bilinguals, whose two languages are less closely related within the Indo-Germanic language family tree.

RESEARCH QUESTIONS AND HYPOTHESES

This study aims at finding out in how far the profile effects found in the bilingual proficiency profiles of Dutch-German and Greek-German bilinguals can be explained by dominance in current and cumulative input and use in the two languages. It is expected that dominance in exposure will affect the bilinguals' dominance profile, leading to higher degrees of proficiency in the language with more input and lower degrees of proficiency in the language with less input. In line with previous research on bilingual profile effects, it is also expected that dominance in exposure affects subcomponents of bilingual proficiency differently.

In order to find out, how different components of bilingual proficiency are affected differently by dominance, this study compares the bilinguals' dominance in proficiency by means of two different tasks, an isolated productive vocabulary task and a more contextualized narrative task. When comparing the two types of tasks, it is expected that the results of the multidimensional narrative analysis will provide a more nuanced picture than the one-dimensional results of the vocabulary scores. When taking into account the different subskills of narrative proficiency measured in the narrative task, it is expected that microstructural measures of narrative discourse ability will be more vulnerable to dominance in exposure when compared to macrostructural measures.

Additionally, this study investigates to what extent linguistic similarities and differences between the bilinguals' two languages affect profile effects. On a global level, it is expected that linguistic distance will interact with dominance in exposure. Since Dutch and German are more closely related than Greek and German, it is expected that effects of dominance in exposure will be reflected to a lesser degree in the proficiency profiles of the Dutch-Germans when compared to the Greek-Germans. With respect to the vocabulary task, it is expected that linguistic similarities in the lexical domain result in cognate facilitation effects in the test results of the Dutch-German bilinguals when compared to the test results of the Greek-German bilinguals. With respect to proficiency measured by the narrative tasks, it is expected that individual narrative skills will be affected by crosslinguistic similarities and differences. It is expected that microstructural measures are more affected by this than macrostructural ones, since the former are more language-specific and less generalizable than the latter.

METHOD

PARTICIPANTS

The participants in this study all attended 5th grade at different schools in the German state of Northrhine-Westfalia at the time of testing. The 15 Dutch-German participants (DuGe) were all recruited from a secondary school close to the Dutch-German border.[2] It offers 50–50 dual immersion in the neighbor languages Dutch and German for bi- and monolingual children from the area, who grow up with Dutch and/or German as one of their home languages. The 15 Greek-German participants (GrGe) consist of a subset of the Greek-German bilinguals that

were investigated as part of the BALED- and CoLiBi-projects (2011–2015).[3] This group was age-matched to the Dutch-Greek group and consists of 10-year-olds from various educational contexts offering heritage language instruction for children of Greek origin.

Table 1 provides biographical information elicited by means of a background questionnaire. A chi-square test indicated that there were no differences in gender distribution between the two groups (χ^2 (1, N = 40) = 0.100, p = 0.752). An independent samples t-test confirmed that the two groups were also comparable in terms of Age at time of testing (t (28) = 1.021, p = .316).

	DUTCH-GERMAN (N = 15)	GREEK-GERMAN (N = 15)
Gender		
Female	7	8
Male	8	7
Age at time of testing (ATT) in months (Standard deviation)	132.00 (4.64)	130.12 (5.41)
Age of onset (AoO) German		
Up to age 3	13	11
Up to age 6	2	3[a]
Age of onset (AoO) Dutch/Greek		
Up to age 3	4	14[a]
Up to age 10	3	
From age 10	8	
Simultaneous exposure to both languages from birth onwards	2	8

Table 1 Biographical background information by bilingual group.

[a] One missing value due to one missing background questionnaire.

In terms of age of onset (AoO) of exposure to the two languages, the profiles of the two bilingual groups differ to a significant degree. Only two of the Dutch-German children have grown up simultaneously exposed to both languages from birth onwards. Most of them have been exposed to German from an early age, while a smaller proportion has been exposed to Dutch from early on. This reflects the living conditions in this Dutch-German border area, with a majority German-speaking population, a minority Dutch-speaking population and a few mixed families. The Greek-German group has a classic heritage language learner profile. More than half of the children grew up with both Greek and German from birth onwards and virtually all children were exposed to the minority language Greek from birth onwards or soon thereafter. Children not exposed to the majority language German from birth onwards started to acquire it at the latest by age four when they entered German nursery.

MEASURING DOMINANCE IN EXPOSURE

In order to assess dominance in input, information on the amount of exposure in the two languages was retrieved from background questionnaires administered to the children themselves.[4] Children indicated the amount of exposure they received on a three-level Likert-scale. The three-level Likert-scale ensured that children were not confronted with complex choices when being asked about their past and current behavior. Since the questionnaires administered to the two groups differed, only those questions entered the analysis that were comparable across questionnaires. Two composite input scores were compiled. 16 questions contributed to the cumulative input score, Oral Language History (OLH), indicating the amount of oral language exposure the participants received in the two languages over the course of their childhood. The second score, Current Language Use (CLU), comprised of 19 questions administered to the Dutch-German bilinguals and 23 questions administered to the Greek-German bilinguals.[5] Questions contributing to this score were related to the participants' current exposure and use in the two languages. Scores were computed following the protocol described in Mattheoudakis et al. (2016). This resulted in two proportionate exposure scores, one for German and one for Dutch/Greek for OLH and CLU respectively. In a final step the proportionate scores in the minority

language (Dutch/Greek) were subtracted from the proportionate scores in German yielding two differential scores following the rationale described in Unsworth et al. (2018), with positive scores indicating dominance in German and negative scores indicating dominance in Dutch resp. Greek.

The scatterplots in ***Figure 1*** show the distribution of dominance in Oral Language History (OLH) and Current Language Use (CLU) for both groups of bilinguals on a scale from -1,0 indicating complete input in the other language (i.e. Dutch or Greek), to 1,0 indicating complete input in German. They show that the Dutch-German bilinguals, as a group, receive considerably more input in German. In fact, 6 of the Dutch-German participants indicate that they had no exposure to Dutch prior to entering the school and 5 of these children indicate that this still is the case for CLU outside of school. The exposure profiles of the Greek-German bilinguals are more evenly distributed across the spectrum. However, their dominance shifts slightly from OLH to CLU indicating less exposure to Greek in their CLU when compared to their OLH. This difference between the two groups was confirmed to be highly significant in independent samples t-tests for OLH (t (28) = 3.798, p = 0.001) and for CLU (t (28) = 5.461, p < 0.001). A Pearson's r analysis indicated that in both bilingual groups OLH and CLU were strongly correlated (DuGe: r (15) = .768, p = .001; GrGe: r (15) = .709, p = .003).

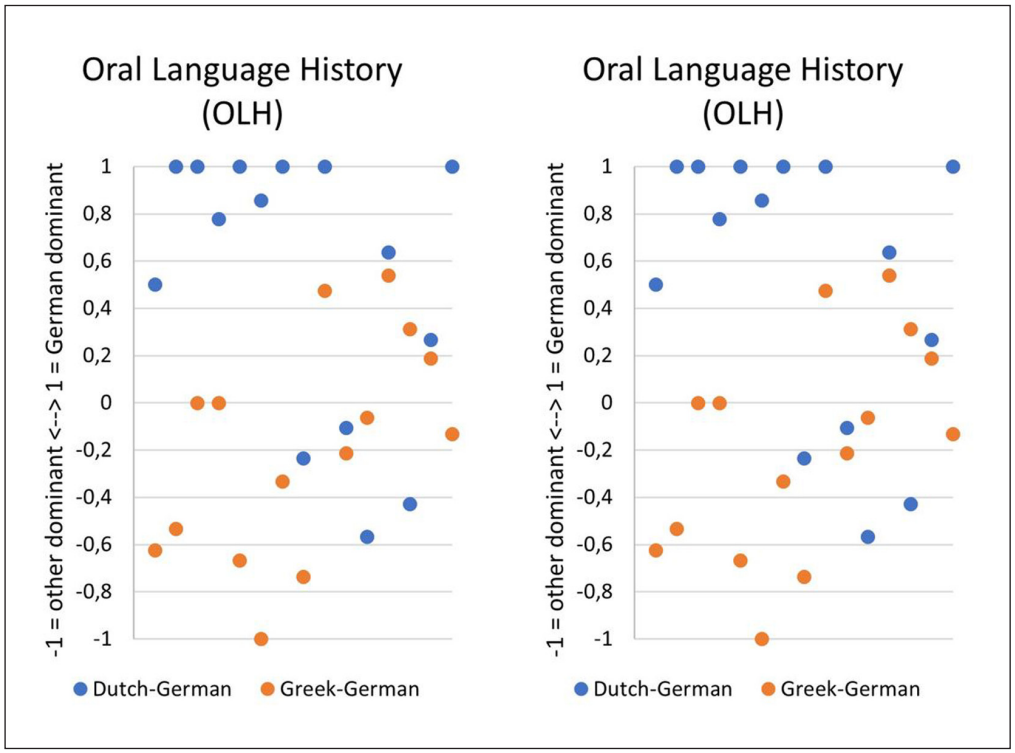

Figure 1 Dominance in exposure for a. Oral Language History (OLH) and b. Current Language Use (CLU) by participant. 0 indicates complete balance, –1 indicates complete dominance in Dutch/Greek, +1 indicates complete dominance in German.

MATERIALS AND PROCEDURE

Vocabulary measures were obtained by means of productive picture-naming tasks. The Greek-German bilinguals were tested using the picture-naming task from the SET 5-10 (Petermann et al., 2010) and a Greek version of the Renfrew Vocabulary Scales (Vogindroukas et al., 2009). The SET 5-10 consists of 40 pictures (30 nouns and 10 verbs) and is normed for an age-range between 5–10 years, while the Renfrew test consists of 50 pictures, all nouns, and is normed for an age-range between 3–9 years.[6] To ensure comparability across languages, scores were normalized as percentage scores of correctly named items (cf. Knopp, 2019). Since comparison to monolingual norms is not a goal of the present study, the Dutch-German bilinguals were tested using both a German and Dutch version of the Renfrew Vocabulary Score (Renfrew, 1998). The decision to use the same test in both of the Dutch-German bilinguals' languages was made in order to better control for cognate facilitation across the two closely related languages, since using the same items ensures that both language versions of the test contain items that are similar to comparable degrees.[7] Answers to the picture-naming tasks were recorded and subsequently transcribed by native speakers. Following the scoring protocol of both tests, one point was attributed to each correct answer.

For the elicitation of the narratives, the Edmonton Narrative Norms Instrument (ENNI; Schneider, et al., 2006) was chosen, since it offers two series of picture-stories of comparable complexity so that repetition effects were avoided (Alvarez, 2003). In view of the age of participants, the most complex ENNI-stories, A3 and B3, with three episodes involving two major and two minor characters on 13 pictures were selected.

To ensure a high degree of comparability, participants retold the story after they had heard a model-version (Andreou et al., 2015). This procedure also entices children to make full use of their range of expression (Gagarina et al., 2012; Schneider & Vis Dubé, 2005). Model versions were constructed by native speakers of all three languages and controlled for comparability with respect to the narrative measures under investigation (see Knopp 2019, 154f. for a detailed description). Following the procedure recommended by Gagarina et al. (2012), stories were recorded by native-speaker narrators and incorporated into an animated PPT, in which the participant saw the pictures of the story two-by-two while listening to the model-story.

All participants were recruited via their school and parental consent was obtained for all participants prior to testing.[8] Testing took place on separate days in the two languages. For practical reasons, testing of the Greek-German group took place within one week. To control for repetition effects, the order of languages alternated across participants in this group. In close communication with the school management, a different protocol was used for the Dutch-German bilingual group: To reduce test anxiety, this group was first tested in their dominant language German and then in their weaker language Dutch. Test sessions took place one week apart in order to keep repetition effects to a minimum. Participants were tested individually in a quiet room at school by a native speaker of the respective language. The order of subtests was kept constant, first conducting the picture-naming task and then the narrative retell task. Both tasks were audio-recorded to prevent distraction of participants. The distribution of story stimuli was counterbalanced, with 50% of participants retelling ENNI-A3 in German and ENNI-B3 in the respective other language and vice versa.

ANALYSIS OF NARRATIVES

Retellings were transcribed by trained native speakers using standard orthography and basic CHAT-conventions (MacWhinney, 2000). Transcripts were checked by native speakers and/or the author herself and divergent assessments were solved by discussion. Transcripts were separated into clauses as the basic unit of analysis. In line with Berman and Slobin (1994) clauses were defined as all finite and non-finite predicates and their dependents. To analyze the different narrative measures, transcripts were coded manually using MS-excel. A first coding was conducted by the author herself. A selection of transcripts was double-blind coded by trained native speakers of the respective language. In case of disagreement, these were discussed and the coding-scheme revised accordingly. The revised coding scheme was then applied to all transcripts.

Analysis of productivity

On lexical level, productivity was measured by counting the number of content words. For this, all content words (i.e., nouns, verbs, adjectives and adverbs) were identified following Bongartz and Torregrossa (2017). While numeral, demonstrative and possessive adjectives, as well as pronominal adverbs, such as *darüber* (English *above it*), were excluded from the analysis, particle verbs such as *weglaufen* (English *run away*) were counted separately from their root-verbs, such as *laufen* (English *run*).

On syntactic level, productivity was measured by counting the overall number of clauses that a participant had produced, since clauses have been found to be a relatively stable cross-linguistic measurement of length (Berman & Slobin, 1994).

Analysis of microstructure

The microstructural make-up of the stories was measured in the lexical and syntactical domain. Lexical diversity was measured following Bongartz and Torregrossa (2017) by means of a type-token-ratio of content words. In order to control for differences in length of narrative, a root-type-token-ratio (RTTR) was calculated following Guiraud (1960).[9]

To get an indication of the syntactic complexity, clauses were coded either as independent main clauses or as dependent subordinate clauses. Clausal complexity was then measured by dividing the number of subordinate clauses by the number of all clauses rendering a proportionate percentage score with higher percentages indicating higher levels of clausal complexity.

Analysis of macrostructure

In line with Gagarina (2016), macrostructure was also investigated on two levels. On lexical level an analysis of the use of mental state terms (MSTs) was conducted by identifying and counting all mental state terms in the transcripts. In line with Bongartz and Torregrossa (2017), the following types of lexical items counted as MSTs: adjectives of emotion (e.g. *happy*), verbs of volition (e.g. *want*), verbs of affect (e.g. *cry*) and verbs of cognition (e.g. *think*). In order to control for differences in length, the absolute number of MSTs was divided by the square root of the number of content word tokens.

The second macrostructural measure under investigation was story grammar. As a diagnostic tool, the ENNI story stimuli are constructed on the basis of the Story Grammar Model by Stein and Glen (1979). The analysis of Story Grammar in the data, consequently, followed the protocol of Schneider et al. (2006) rendering a score of a maximum of 38 points. For a detailed illustration of the coding procedure see Knopp (2019, 2021).

RESULTS

PRODUCTIVE VOCABULARY SCORES

Figure 2 presents the results of the vocabulary tests for both groups of bilinguals in both of their languages. Scores were normalized as percentage of correctly named items. On average, the Dutch-German bilinguals scored 91.33% (*SD* = 3.6) of the items on the German test correctly, while they scored 54.53% (*SD* = 21.37) of the items on the Dutch test correctly. The Greek-German bilinguals, on the other hand, on average scored 79.67% (*SD* = 17.31) of the stimuli on the German test correctly, while they scored 51.87% (*SD* = 20.77) of the stimuli on the Greek test correctly. The data was not normally distributed within the two test groups and standard deviations indicated that no homogeneity of variances could be assumed across groups and languages. Inferential statistics were, consequently, conducted using non-parametric tests.

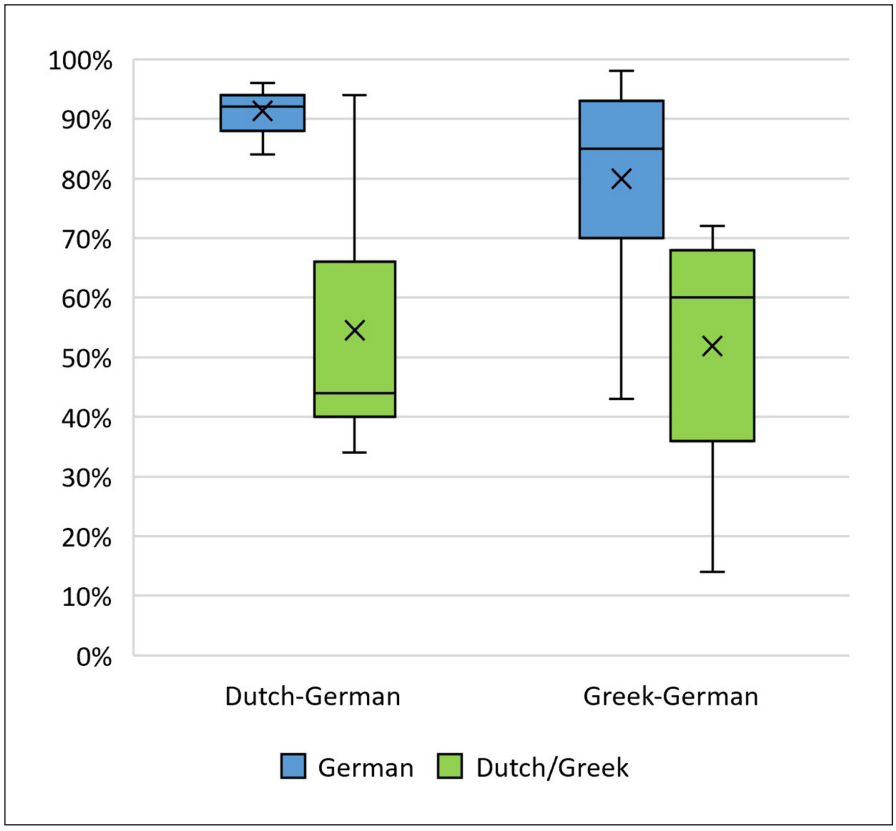

Figure 2 Results of productive vocabulary tasks (percentage of correct items) by bilingual group. Boxplots indicating medians (as line) and means (as cross).

The boxplots suggest that the Dutch-German bilinguals' scores are higher and more uniform than the Greek-German bilinguals on German vocabulary. However, there is still overlap. A Mann-Whitney-U-test, consequently, could not confirm that the observed difference was statistically significant (U = 67.00, p = .058). A Mann-Whitney-U-test also indicated no significant difference between the vocabulary scores in the minority languages (Dutch and Greek, U = 104.500, p = .740). Wilcoxon-signed-ranks-tests found that both groups of bilinguals score significantly higher in German when compared to their respective other language (DuGe: Z = -3.126, p = .002, r = -0.57; GrGe: Z = –2.642, p = .008, r = –0.48).[10] This indicates that both groups are German-dominant in terms of their productive lexical proficiency.

To get a better insight into dominance in the vocabulary scores, the normalized vocabulary scores in the minority language (i.e., Dutch resp. Greek) were subtracted from the German vocabulary scores rendering differential scores following Unsworth et al. (2018), with 0 being perfectly balanced, 1 being dominant in German and -1 being dominant in the respective other language.

The boxplots in ***Figure 3*** confirm that both groups are more dominant in German vocabulary than in the respective other language. There is substantial overlap between the two groups. This is striking, when compared to the dominance profiles in exposure (***Figure 1***), where the two groups differed to a significant degree. Nonetheless, non-parametric correlations using Kendall's tau-b indicated that dominance in OLH and CLU correlated with dominance in vocabulary for both bilingual groups. In the Dutch-German dataset dominance in OLH and in CLU correlated strongly and positively with dominance in vocabulary scores (OLH: τ_b = .787; p < .001; CLU: τ_b = .703; p = .001). In the Greek-German dataset, only dominance in CLU correlated strongly with vocabulary scores (τ_b = .746; p < .001). Dominance in OLH was associated with dominance in vocabulary to a lesser degree (τ_b = .421; p = .029).

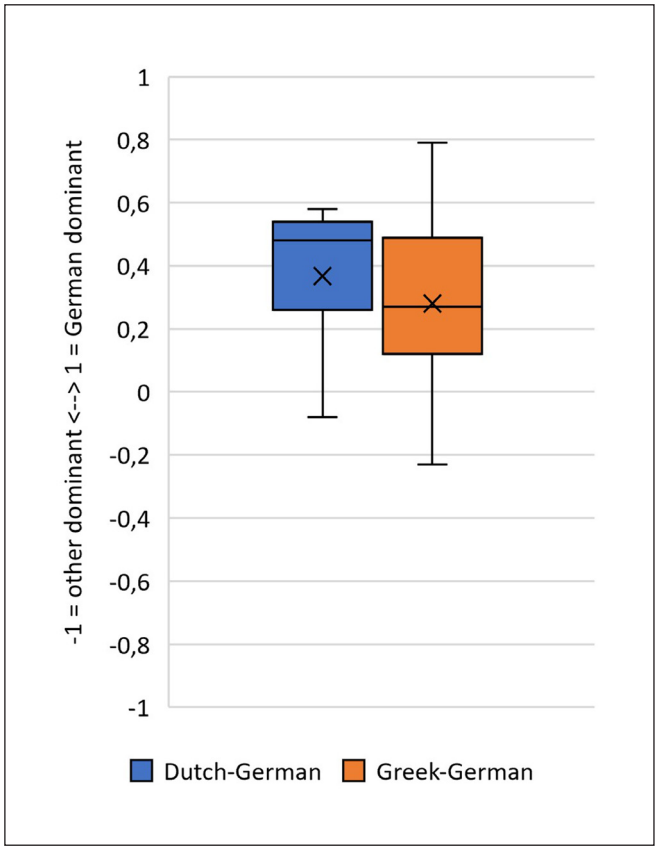

Figure 3 Dominance in productive vocabulary (based on percentage of correct items) by bilingual group. Boxplots indicating medians (as line) and means (as cross). 0 indicates complete balance, –1 indicates complete dominance in Dutch/Greek, +1 indicates complete dominance in German.

RESULTS FROM THE NARRATIVE ANALYSIS

Overview

Table 2 presents an overview of the results obtained for all measures of narrative proficiency under investigation giving means and standard deviations in brackets for each bilingual group in both of their languages. Data was found to be normally distributed within each group. ***Table 2***, accordingly, also contains the results from independent samples t-tests to reveal between-

group differences per language and results from paired-sample t-tests to reveal within-group differences between languages. In the following, these findings will be reviewed by domain of narrative analysis. Whenever p-values below .05 indicated that differences were significant, effect size was measured using Hedges' g in order to correct for small sample size (Goulet-Pelletier & Cousineau, 2020; Lakens, 2013).[11] Effect sizes are presented in ***Table 2*** following the t-value.

NARRATIVE DOMAIN	NARRATIVE MEASURE	LANGUAGE	DUTCH-GERMAN	GREEK-GERMAN	INDEPENDENT SAMPLES T-TEST	PAIRED SAMPLES T-TEST
			M (SD)	*M (SD)*	*T (28), HEDGE'S G_s*	*T (14), HEDGE'S G_{AV}*
Productivity	No. of content words	German	60.40 (13.01)	58.87 (14.57)	.304	DuGe: 2.908*, 1.021
		Dutch/Greek	45.27 (15.03)	57.80 (22.69)	–1.783	GrGe: .130
	No. of clauses	German	28.07 (6.05)	27.80 (5.60)	.125	DuGe: 7.290**, 2.215
		Dutch/Greek	16.67 (3.68)	27.73 (9.35)	-4.267[12]**, –1.516	GrGe: .024
Micro-structure	Lexical diversity (RTTR)	German	5.20 (0.59)	4.77 (0.49)	2.176*, 0.773	DuGe: 3.486**, 1.218
		Dutch/Greek	4.34 (0.74)	4.37 (0.72)	–1.783	GrGe: 1.567
	Clausal complexity	German	0.21 (0.06)	0.18 (0.09)	.748	DuGe: 1.115
		Dutch/Greek	0.17 (0.12)	0.28 (0.07)	–3.084**, 1.096	GrGe: –2.870*, -1.131
Macro-structure	Mental state terms	German	1.33 (0.18)	1.45 (0.22)	–1.663	DuGe: 2.866*, 1.088
		Dutch/Greek	1.05 (0.29)	1.37 (0.48)	–2.149*, –0.763	GrGe: .664
	Story Grammar Score	German	26.87 (2.8)	26.33 (2.09)	.591	DuGe: 2.677*, 0.950
		Dutch/Greek	23.73 (3.43)	25.40 (4.7)	–1.109	GrGe: .575

Table 2 Results from narrative analysis by bilingual group (means, standard deviations, between and within group effects) per domain, narrative measure and language.

* $p < .05$. ** $p < .01$.

Productivity

Results on lexical productivity indicate that the Dutch-German group produced stories with significantly more content word tokens in German (*M* = 60.4) when compared to their Dutch stories (*M* = 45.27). The Greek-German bilinguals, on the other hand, produced stories with a comparable number of content word tokens in German (*M* = 58.87) and Greek (*M* = 57.80). When comparing the two groups on levels of lexical productivity, no differences were found in the German stories, nor in the Dutch resp. Greek stories.

Inferential analysis of clausal productivity measured by the number of clauses revealed that the Dutch-German bilinguals retold significantly shorter stories in Dutch (*M* = 16.67) than they did in German (*M* = 28.07). This was not the case for the Greek-German bilinguals, who produced stories that were of similar length across their two languages (Greek: *M* = 27.73 vs. German: *M* = 27.80). No differences were found between the two groups, when comparing their syntactic productivity in German. When comparing the stories in their respective other language, however, the Dutch-German bilinguals produced significantly shorter stories in Dutch (*M* = 16.67) than their Greek-German bilingual peers in Greek (*M* = 27.73).

Microstructure

Results from the analysis of lexical diversity indicate that the RTTRs of the German stories produced by the Dutch-German bilinguals were significantly higher (*M* = 5.2) than those of their Dutch stories (*M* = 4.34). Again, no differences between the German (*M* = 4.77) and the Greek (*M* = 4.37) stories produced by the Greek-German bilinguals could be found with respect to this narrative measure. A different pattern was found when comparing the RTTRs of the respective languages across the two groups. In the German data, it was found that the Dutch-German bilinguals produced stories with significantly higher RTTRs (*M* = 5.20) when compared to their Greek-German bilingual peers (*M* = 4.77). At the same time, no significant differences emerged when comparing the lexical diversity levels of the stories produced in the bilinguals' respective other language.

Paired-sample t-tests indicated that the proportion of subordinate clauses produced by the Dutch-German bilinguals was comparable across their two languages (Dutch: *M* = 0.17; German: *M* = 0.21), while the proportion of subordinate clauses produced by the Greek-German bilinguals in their Greek stories (*M* = 0.28) was significantly higher than that in their German

stories (*M* = 0.18). No differences were found between the two groups, when comparing their clausal complexity in the German stories. In their respective other language, however, it was found that the Dutch stories produced by the Dutch-German bilinguals had significantly lower proportions of subordinate clauses than the Greek stories produced by the Greek-German bilinguals.

Macrostructure

The analysis of the use of mental state terms, once again, showed a similar pattern as most of the other measures before: The Dutch-German bilinguals produced stories with significantly higher numbers of MSTs in German (*M* = 1.33) than in Dutch (*M* = 1.05). In the Greek-German dataset, however, no differences could be detected between the bilinguals' two languages with respect to this measure. No differences were found between the two groups, when comparing their use of MSTs in the German stories. In their respective other language, however, the Dutch stories by the Dutch-Germans featured significantly lower proportions of MSTs (*M* = 1.05) when compared to the Greek stories produced by their Greek-German peers (*M* = 1.37).

The pattern emerging from the analysis of story grammar rendered an only slightly diverging picture. Again, the Dutch-German bilinguals produced stories with significantly higher story-grammar scores (SG-scores) in German (*M* = 26.87) than in Dutch (*M* = 23.73). And again, no differences with respect to this measure could be detected between the German (*M* = 26.33) and the Greek (*M* = 25.40) stories produced by the Greek-German bilinguals. Again, no differences were found between the two groups, when comparing their SG-scores in German. Finally, no differences emerged when comparing the SG-scores of the Dutch stories produced by the Dutch-German bilinguals with those of the Greek stories produced by the Greek-German bilinguals.

Dominance in narrative proficiency compared to dominance in exposure

In order to get a better insight into how dominance manifested itself across the different measures of narrative proficiency, difference scores were computed for all measures, by subtracting the score obtained for the bilinguals' respective other language from the score obtained for German (Unsworth et al., 2018). The group means of these difference scores are presented in ***Table 3***. The fact that most means are above zero indicates that both groups, on average, score higher on the respective narrative measure in German when compared to their respective other language; the only exception being the degree of clausal complexity produced by the Greek-German bilinguals, where higher degrees of clausal complexity in the Greek stories on average lead to a slight negative difference score of -0.09. The results in ***Table 3*** indicate that for nearly all measures dominance in German is more pronounced in the Dutch-German group, when compared to the Greek-German group.

NARRATIVE DOMAIN	NARRATIVE MEASURE	DUTCH-GERMAN	GREEK-GERMAN
		M (SD)	*M (SD)*
Productivity	No. of content words	15.13 (20.6)	1.07 (31.75)
	No. of clauses	11.40 (6.05)	0.07 (10.92)
Microstructure	Lexical diversity (RTTR)	0.08 (0.95)	0.39 (0.97)
	Clausal complexity	0.39 (0.13)	–0.09 (0.13)
Macrostructure	Mental state terms	0.27 (0.37)	0.08 (0.50)
	Story Grammar score	3.13 (4.53)	0.93 (6.28)

Table 3 Dominance in narrative ability by bilingual group (group means and standard deviations) per domain and narrative measure. 0 indicates complete balance, –1 indicates complete dominance in Dutch/Greek, +1 indicates complete dominance in German.

To find out how dominance in exposure was related to dominance in the individual narrative measures, Pearson's correlational analyses were conducted for each group separately between the individual difference scores and the dominance scores for the two exposure domains: oral language history (OLH) and current language use (CLU).

The results presented in ***Table 4*** indicate that dominance in exposure was related differently to the individual scores and across the two different groups. When considering dominance in lexical productivity (i.e., no. of content word tokens), it was found that this variable strongly positively correlated with OLH and CLU in the Dutch-German dataset. In the Greek-German

NARRATIVE DOMAIN	NARRATIVE MEASURE	DOMAIN OF EXPOSURE	DUTCH-GERMAN	GREEK-GERMAN
			r	*r*
Productivity	No. of content words	OLH	.651**	.591*
		CLU	.627*	.397
	No. of clauses	OLH	.226	.655**
		CLU	.200	.296
Microstructure	Lexical diversity (RTTR)	OLH	.497	.697**
		CLU	.586*	.775**
	Clausal complexity	OLH	.692**	.098
		CLU	.759**	–.023
Macrostructure	Mental state terms	OLH	.687**	.265
		CLU	.736**	-.024
	Story Grammar score	OLH	.282	.333
		CLU	.279	.474

Table 4 Correlations between dominance in narrative ability and dominance in exposure by domain, measure and bilingual group.

* $p <. 05$. ** $p <. 01$.

dataset, however, only dominance in OLH correlated moderately with dominance in lexical productivity. Dominance in syntactic productivity (i.e., no. of clauses) was not correlated to dominance in exposure in the Dutch-German data. Yet, a strong positive correlation emerged for dominance in syntactic productivity and OLH in the Greek-German data. Dominance in lexical diversity (i.e., root-type-token-ratio of content words) moderately correlated with dominance in OLH in the Dutch-German data. In the Greek-German data, however, dominance in lexical diversity was strongly associated with both OLH and CLU. Dominance in clausal complexity was strongly associated with both OLH and CLU in the Dutch-German stories, while no correlations were found between these variables in the Greek-German dataset. Finally, dominance in the use of mental state terms was strongly positively correlated with dominance in OLH and CLU in the Dutch-German dataset. This could not be attested for the Greek-German stories. For dominance in story grammar scores, no correlations were found with dominance in both datasets.

SUMMARY OF FINDINGS

MEASURE		SIGNIFICANT WITHIN GROUP EFFECTS		CORRELATIONS WITH DOMINANCE IN EXPOSURE		SIGNIFICANT BETWEEN GROUP EFFECTS	
		PARTICIPANT GROUP			LANGUAGE		
		DUTCH-GERMAN	GREEK-GERMAN	DUTCH-GERMAN	GREEK-GERMAN	GERMAN	DUTCH/GREEK
Vocabulary scores							
Productive vocabulary		Ge > Du**	Ge > Gr**	OLH** CLU**	OLH* CLU**		
Narrative analysis							
Productivity	No. of content word tokens	Ge > Du*		OLH** CLU**	OLH*		
	No. of clauses	Ge > Du**			OLH**		Gr > Du**
Micro-Structure	Lexical diversity (RTTR)	Ge > Du**		CLU*	OLH** CLU**	DuGe > GrGe*	
	Clausal complexity		Gr > Ge*	OLH** CLU**			Gr > Du**
Macro-structure	Mental state terms	Ge > Du*		OLH** CLU**			Gr > Du**
	Story Grammar score	Ge > Du*					

Table 5 Summary of significant within and between group effects and correlations between dominance measures by bilingual group.

* $p < .05$. ** $p < .01$.

Table 5 presents a summary of all statistically significant findings in this study. It indicates that the analysis of the bilinguals' narrative productions renders a profile that is considerably more nuanced than the analysis of their productive vocabulary scores. The vocabulary scores indicated that both bilingual groups were comparable. They were both dominant in the majority language German, while the vocabulary scores in their respective other language (i.e., the minority languages Dutch and Greek) were not significantly different. Nonparametric correlational analyses indicated that dominance in vocabulary significantly positively correlated with dominance in both exposure indexes (OLH and CLU) for both groups of bilinguals.

In their narrative profiles, however, the two bilingual groups were less comparable. The Dutch-German group produced stories that, with the exception of clausal complexity, were longer and more sophisticated in terms of micro- and macrostructure in German when compared to Dutch. The Greek-German bilingual group, however, produced stories that were similarly long and complex in their two languages, with the exception of syntactic complexity, which was higher in the Greek stories.

Correlational analyses between dominance in exposure, measured by oral language history (OLH) and current language use (CLU), also indicated differences between the two groups. In the Dutch-German dataset positive correlations were found between dominance in OLH and dominance in lexical productivity, lexical diversity, clausal complexity and the number of mental state terms. In addition to this, dominance in CLU also positively correlated with dominance in lexical productivity, clausal complexity and the use of mental state terms. In the Greek-German dataset, on the other hand, dominance in OLH positively correlated with dominance in lexical and syntactic productivity as well as lexical diversity. Dominance in CLU only positively correlated with dominance in lexical diversity.

Between-group comparisons indicated that the German stories produced by the two bilingual groups did not differ with the exception of lexical diversity (RTTR), which was found to be higher in the Dutch-German dataset when compared to the Greek-German dataset. When comparing the stories produced by the two groups in the respective minority language, a mixed picture emerged: While both groups performed comparably with respect to lexical productivity (no. of content words), lexical diversity (RTTR) and Story Grammar, the Greek stories by the Greek-German bilinguals were significantly longer (no. of clauses), more syntactically complex (clausal complexity) and featured more mental state terms than the Dutch stories produced by the Dutch-German bilinguals.

DISCUSSION

EFFECTS OF DOMINANCE IN EXPOSURE ON BILINGUAL PROFILES

In this study, two groups of bilinguals were compared that differed in terms of their dominance in exposure to the two languages. The Dutch-German bilinguals were found to be considerably German-dominant with respect to current and cumulative exposure (i.e., CLU and OLH). The Greek-German bilinguals, on the other hand, were more balanced in both exposure measures. The stark difference in dominance in exposure profiles appears to be at least partly related to the fact that 8 of the 15 participants in the Dutch-German group only started to acquire Dutch on a regular basis upon entering the bilingual school, i.e. at the age of ten.

In line with previous research (Gagarina, 2016; Knopp, 2019; Uccelli & Páez, 2007; Unsworth, 2015; Unsworth et al., 2018), it was expected that dominance in exposure would affect the bilinguals' dominance in proficiency. This expectation was only partly confirmed when comparing the dominance in proficiency profiles emerging from the vocabulary and the narrative task. In the vocabulary task, it was found that both groups of bilinguals scored comparably on German vocabulary and on vocabulary in their respective other languages. Despite the fact that the exposure profile indicated that Greek-German bilinguals were considerably more balanced than the Dutch-German bilinguals, both groups were German-dominant in terms of vocabulary and the scores of the German vocabulary test and the Dutch resp. Greek vocabulary test differed to roughly similar degrees in terms of effect sizes. The results from correlational analyses between dominance in the two exposure indexes and dominance in vocabulary scores indicated that in both bilingual groups dominance in past and present exposure correlated significantly with dominance in productive vocabulary. However, the fact that dominance

in Oral Language History (OLH) in the Greek-German data set correlated with dominance in vocabulary to a lesser degree (τ_b = .421; p = .029) than dominance in OHL in the Dutch-German dataset (τ_b = .787; p < .001), while the positive correlations for Current Language Use (CLU) were comparable across groups (i.e. GrGe: τ_b = .746; p < .001 vs. DuGe: CLU: τ_b = .703; p = .001) might provide an explanation, namely, that the vocabulary task is more affected by exposure to CLU in which the two groups differ to a lesser degree when compared to OLH.

A different picture emerged from the narrative tasks. Here the expectation that dominance of exposure would predict dominance in proficiency was confirmed on a global level, since the Dutch-German bilinguals scored significantly higher on nearly all subcomponents of narrative discourse ability in German when compared to Dutch. The more balanced Greek-German bilinguals, on the other hand, produced stories that were comparable across the two languages in terms of nearly all measures of narrative discourse ability.

With relation to the narrative task, it was also expected that dominance would affect the individual subcomponents of narrative proficiency differently. In line with previous research, it was expected that microstructural skills would be more affected than macrostructural skills (Gagarina, 2016; Knopp, 2019; Paradis & Kirova, 2014). This could not be confirmed on group-level, since the narrative profile of the Dutch-Germans showed an overall dominance of German, irrespective of the subcomponent of narrative discourse ability, while the narrative profile of the Greek-German bilinguals indicated an overall balance of the bilinguals' narrative abilities across the two languages. It appears, thus, as if the dominance in exposure that was found for the Dutch-German group was too stark as to allow for transfer of narrative skills from their dominant to their non-dominant language (see e.g. Gagarina, 2016; Knopp, 2019; Squires et al., 2014; Uccelli & Páez, 2007).

Correlational analyses conducted for both groups separately between dominance in exposure and dominance in each subcomponent of narrative discourse ability rendered a more nuanced profile. They confirmed that dominance in exposure is differently related to dominance in the individual narrative measures. If measures of productivity are considered as microstructural measures (as suggested in Gagarina et al., 2012), it can be confirmed that dominance in exposure mostly correlated with dominance in microstructural measures, namely lexical productivity, clausal productivity, lexical diversity and syntactic complexity. However, the correlational analysis also indicated that dominance in a macrostructural measure, namely the use of mental state terms, strongly correlated with dominance in oral language history (OLH) and current language use (CLU) in the Dutch-German dataset. This was not the case for the other macrostructural measure, i.e., story grammar. This finding is in line with findings by Gagarina (2016) and Knopp (2019). Gagarina (2016), who investigated the narratives of Russian-German bilinguals, found crosslinguistic associations in their reference to core story grammar units (i.e., goals, attempts, outcomes) but not so in their use of mental-state terms, where the older children in her study were more dominant in the majority language. Knopp (2019) also found that the Greek-German bilinguals in her study shared core story grammar units to a greater extent across their two languages than they shared story grammar units associated with mental states. Gagarina (2016) argues that the use of mental state terms is more dependent on the knowledge of specific lexical items than this is the case for other more generalizable macrostructural measures, such as story grammar. This specific lexical knowledge, she argues, is strongly dependent on the continued exposure in the respective language. This is confirmed by the findings made for the Dutch-German group, where dominance in exposure strongly correlated with dominance in the use of mental state terms both with respect to OLH and CLU. The fact that dominance in OLH and CLU was not correlated to dominance in SG-scores in both bilingual groups, again confirms the findings of previous studies (Gagarina, 2016; Iluz-Cohen & Armon-Lotem, 2013; Knopp, 2019; Squires et al., 2014; Uccelli & Páez, 2007), namely that story grammar is a crosslinguistically robust macrostructural measure that is less sensitive to dominance in exposure than other narrative measures.

The correlational analysis also brought to light slight differences between the two exposure measures. While, in most cases, correlations were found for dominance in both OLH and CLU, there were cases in which dominance in only ONE of the two indexes was correlated to dominance in a narrative measure. This was the case for dominance in the number of content words and clauses in the stories produced by the Greek-German bilinguals. Here, only

dominance in cumulative exposure (OLH) was positively correlated. On the other hand, it was found that dominance in lexical diversity in the stories produced by the Dutch-German bilinguals was only correlated to dominance in current language use (CLU). This confirms that different domains of linguistic knowledge are affected differently by dominance in different domains of use (Treffers-Daller, 2019; Unsworth, 2013).

INTERACTIONS WITH LINGUISTIC DISTANCE

One of the starkest findings, however, was that dominance in exposure correlated differently with dominance in proficiency across the two groups. As mentioned above, this is most apparent when considering the results from the vocabulary scores. It is a striking finding that the two groups scored comparably in the two vocabulary tasks, while their narrative profiles and their dominance in exposure profiles differed so starkly from each other. This could be the result of a cognate facilitation effect in the results of the vocabulary test of the Dutch-Germans, as it was also found by Lindgren and Bohnacker (2020) for the receptive and productive skills of German-Swedish bilinguals and Goriot et al. (2018) for the receptive skills of Dutch-English bilinguals. Berenschot (2021, p. 92), in fact, confirms that the degree to which a lexical item was named correctly by the 15 Dutch-German bilinguals in this study in the Dutch word-naming task positively correlated with the degree of phonological (τ_b = .492; p < .001) and graphological (τ_b = .497; p < .001) cognate status as measured by Levenshtein distance (Gooskens et al., 2009). The fact that Berenschot (2021) could not find such a correlation in the results of the German word-naming task is in line with studies that showed that cognate facilitation particularly supports bilinguals in their weaker language (Lindgren & Bohnacker, 2020; Rosselli et al., 2016).

A different finding emerged when investigating effects of linguistic distance on the dominance in the narrative proficiency. It was found that the two exposure indexes correlated differently with dominance in narrative discourse ability across the two bilingual groups. It was expected that this would be the case, indicating that different degrees of linguistic distance as embodied by the two different language combinations interact with dominance effects in bilinguals' narrative skills. However, counter to the expectation that the high degree of linguistic similarity between Dutch and German would lessen effects of dominance in the narrative profiles of the Dutch-Germans when compared to the Greek-German bilinguals, a considerably more complex picture emerged.

Group-level comparisons contradicted the raised expectations. The stories produced by the Greek-Germans were comparable across languages despite the comparatively low degree of linguistic similarity between German and Greek. At the same time, the stark degree of German dominance of the Dutch-German bilinguals was still reflected in their narrative profile. In other words, the crosslinguistic similarity between Dutch and German could not compensate for the high degree of dominance in German in this group. The only exception to this pattern was found in the analysis of syntactic complexity. While the Greek-German bilinguals produced stories with higher degrees of clausal complexity in Greek when compared to German, the Dutch and German stories produced by the Dutch-Germans were comparable on this measure. Both of these findings could, indeed, be interpreted as effects of linguistic distance. Knopp (2019) argues that the high degrees of clausal complexity produced by the Greek-Germans in her study are an artefact of the specific syntax of modal structures in Greek, which requires the construction of a subordinate complement clause. This is not the case in Dutch or German. Since the Greek-German bilinguals in this study are a subset of the Greek-German bilinguals in Knopp (2019), it can be assumed that this also affects the outcomes of the present analysis. The comparable levels of clausal complexity in the Dutch and German stories of the Dutch-Germans, on the other hand, could be an indication that the high degree of similarity of the syntax of clausal subordination in the two V2 languages Dutch and German (Lutjeharms, 2014) allows these bilinguals to share subordination across their two languages and, thus, balance out the stark degree of dominance in German.

The correlational analysis, again, gave a more nuanced picture. The fact that dominance in exposure predominantly correlated with dominance in lexical measures (i.e., lexical productivity, lexical diversity and, for the Dutch-Germans, the use of mental state terms) supports previous studies' findings that lexical measures are more vulnerable to dominance effects than, for

instance, syntactic measures (Kupisch & van de Weijer, 2015; Paradis, 2011). The differences between the two groups, on the other hand, could at least partly be related to differences in linguistic similarity between the bilinguals' two languages. The fact that dominance in the number of clauses, for instance, only correlated with dominance in exposure in the Greek-German dataset and not in the Dutch-German dataset, could be related to the fact that clausal syntax is very similar across Dutch and German (Lutjeharms, 2014). Differences in linguistic distance, however, cannot explain why dominance in exposure was correlated to dominance in clausal complexity and the use of mental state terms in the Dutch-German dataset (not, however, in the Greek-German dataset). The different outcomes of the correlational analysis for the two bilingual groups, can, consequently, not be entirely explained by effects of linguistic distance and similarity. A reason for this, could be that the two groups differed so starkly in dominance distribution that this might have affected the outcomes of the correlational analysis.

LIMITATIONS OF THIS STUDY

A number of aspects limit the conclusiveness of the present study's findings. First of all, the fact that the two groups of bilinguals developed their two languages in different contexts (i.e., neighbor language vs. heritage language bilingualism) might in and of itself have affected the outcomes of this study. While virtually all of the Greek-German bilinguals were in contact with the minority and majority language from early on in their lives, this was not the case for the Dutch-German bilinguals. For the majority of these children input in the neighbor language Dutch was limited to educational contexts. In fact, 8 of the 15 children in this group had only begun to regularly receive input and instruction in Dutch 9 months prior to testing. Considering this, it should be seen as quite an achievement that these children were able to produce meaningful and coherent stories and get such high scores on the vocabulary test in the minority language. Nevertheless, the fact that the two groups differ so starkly on this aspect, might have considerably affected the findings presented in this study, particularly the findings related to the interaction between linguistic similarity and dominance in the narrative profiles of the bilinguals. In fact, the stark German-dominance of the Dutch-German bilinguals might have disguised potential effects of linguistic distance on dominance in the narrative proficiency profiles of this group. The fact that this groups' dominance profile in the vocabulary task appears to be affected by linguistic similarity is a strong indication that linguistic distance does interact with dominance in exposure and can lead to different degrees of dominance in proficiency, after all.

Another limiting factor is related to the way this study measured dominance, namely by calculating differentials for the independent and dependent variables under investigation following Unsworth et al. (2018). As these authors point out, this is just one way of measuring dominance and it has a number of drawbacks, such as the fact that the resulting dominance scores are not comparable across scales and include positive and negative values. Finally, this study, again, showed that measures of narrative discourse ability are prone to language-specific differences, thus, compromising their crosslinguistic validity (Unsworth et al., 2018; Yip & Matthews, 2006). In a study that aims at discerning effects of dominance from effects of linguistic distance, such as this one, this can lead to circular reasoning. It, hence, remains crucial to compare results of different bilingual language combinations to one another and carefully pay attention to language-specific phenomena that might affect the outcome of measures.

CONCLUSION

This study shows that dominance in exposure and linguistic distance affect bilingual language development. And more important, it indicates that these effects are not homogeneous. Different domains of linguistic knowledge as measured by a productive vocabulary test, and different subcomponents of narrative discourse ability are affected to different degrees. The comparison of two different groups of bilinguals with different language combinations shows that effects of dominance in exposure and effects of linguistic distance interact with each other in bilingual language development. The exact nature of this interaction, however, was not entirely discernable in the present study since the two bilingual groups differed too starkly with respect to their dominance in exposure profiles. The comparison between the results of

an isolated vocabulary task and the results of a multidimensional analysis of bilingual narrative profiles brought to light that such isolated tasks are not always reliable and insightful when it comes to capturing the complexity of bilingual language development, particularly when languages are closely related (see also Goriot et al., 2018). In view of the fact that such tests are often used to assess bilingual populations, this is a crucial finding that will help us to provide better proficiency measures and educational support for the increasing number of children growing up with more than one language.

NOTES

1 Such a comparative approach also prevents a bias towards negative effects of language distance and crosslinguistic influence that has been attested when bilinguals are merely compared to their monolingual peers (Odlin & Yu, 2016).

2 The school is partner in the Interreg-project 'Nachbarsprache&buurcultuur' (*https://www.ru.nl/nachbarsprache/das-projekt/*), a joint project between Radboud University in Nijmegen, the Netherlands, and Universität Duisburg-Essen in Germany, whose aim it is to foster intercultural exchange and learning of the neighbor language between German and Dutch secondary schools in the German-Dutch border area.

3 Results from these projects that were conducted by researchers from Aristotle University, Thessaloniki and the University of Cologne are reported in Andreou et al. (2015), Bongartz and Torregrossa (2017), Dosi et al. (2017), Dosi and Papadopoulou (2020), Knopp (2019, 2021), Mattheoudakis et al. (2016) among others.

4 Background questionnaires were given to the participating children themselves since self-reports of children from 8 and older are reliable (Conijn et al., 2020), and even more so than parental questionnaires when questions concern their activities outside of the home. A further reason for the choice is related to the fact that return rates of parental questionnaires for children recruited via school are often low.

5 The difference in the number of questions between the two questionnaires is related to the fact that in the questionnaire administered to the Greek-German children questions related to the use of language with family members (i.e. parents, siblings, grandparents) were divided between the language the child him-/herself used and the language the respective interlocutor used. However, results indicated that the Greek-German children did not differentiate between themselves and their interlocutor in this questionnaire. For reasons of ecology, it was thus decided to conflate these questions to one question (i.e. *which language is used when you speak with x*) in the questionnaire administered to the Dutch-German group.

6 These tests were chosen in the BALED/CoLiBi-project, since they allow the comparison with monolingual norms in the respective languages, which was one of the goals of the project.

7 Cognate-status was measured using a normalized Levenshtein-algorithm following Beijering et al. (2008) creating a continuous measure of lexical distance, with 0 indicating no phonological or graphological overlap and 1 indicating phonological or graphological identity. See Berenschot (2021) for further information on the procedure. The mean phonological distance of all 50 items was 0,408 (*SD* 0,322) and the mean graphological distance of all 50 items was 0,456 (*SD* 0,316).

8 Ethical approval for the Greek-German data collected within the BALED- and CoLiBi-projects was granted prior to the data collection by the responsible funding body IKY (i.e. Greek research council). Ethical approval for the Dutch-German data collected was granted prior to the data collection following the standard procedures by the Ethics Assessment Committee of the Faculty of Arts at Radboud University. The latter applies criteria of the *Declaration of Helsinki* and the *American Psychological Association (APA)*.

9 The formula for RTTR according to Giraud (1960) is the number of content word types divided by the square root of the number of content word tokens.

10 Since data was not normally distributed effect size is reported as *r* following the formula provided in Fritz, et al. (2012).

11 In independent samples analyses a *Hedges' g* correction was applied to a *Cohen's ds* formula based on the standardized mean difference between the two groups, while in dependent samples analyses the *Hedges' g* correction was applied to a Cohen's dav formula based on the average standard deviation of both repeated measures.

12 Since a Levene's test indicated that the two groups were not comparable in terms of equality of variance on this measure (F (1,28) = 7.683, p = .010), degrees of freedom were adjusted from 28 to 18.233 using a Welch's t-test formula.

COMPETING INTERESTS

The author has no competing interests to declare.

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