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Does Language Input Matter in Bilingual Writing? Translation Versus Direct Composition in Deaf School Students' Written Stories

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This paper presents the findings of an experiment in which 20 Greek Deaf students produced written texts under two different conditions of language input: (1) a translation from a videotaped story in Greek sign language, and (2) a direct composition produced from a picture story – a neutral non-linguistic input. Placing Deaf writing within a bilingual frame, the effect of language input on the quality of written texts was explored, i.e. whether or not the use of sign language facilitates the teaching of written language.

In this paper, similarities and differences between Deaf writers and hearing bilingual writers are explored in terms of current theoretical perspectives on bilingual learners: Deaf writing, similar to bilingual writing, is the result of an interaction between two languages, although in the case of Deaf writing, the languages are an unrelated sign language and written language; the role of first language in teaching; and whether sign language qualifies as L1 for Deaf students. This discussion is complemented by the quantitative results in the study, which showed that the use of a language (in the form of translation) in second language writing may facilitate certain features, such as the organisation of text, but not others, such as the grammar of text. The implications of the findings for bilingual education and Deaf education are discussed.

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Keywords: bilingual education, Deaf writing, direct composition, second language writing, translation

Introduction: Bilingualism and Deaf Education

To date, research in bilingual education has not reached a conclusion about what role should be given to the first language (L1) in teaching the second language (L2). However, the question of whether to use L1 or not, may not be straightforward. For example, it is not always clear which is the L1 and which

the L2, as frequently the mother tongue may not be the best-mastered language. Also, the context in which each language is used may define the languages differently – the dominance of L1 in face communication may not serve as such in the academic context (see Cummins, 1979; theory of communicative versus academic skills).

Research on teaching L2 writing shows that posing a simple question of whether to use L1 or not is inappropriate, because bilingual research must take into account additional parameters, such as the level of proficiency in L2, and the aspects of bilingual product we need to facilitate (Kobayashi & Rinnert, 1992; Wang & Wen, 2002). So, it may be the case that the L1 facilitates different aspects of writing (i.e. structure of the text but not the syntax), and is used differently by low proficiency L2 and high proficiency L2 school students.

Deaf education may be approached from a bilingual perspective. The Deaf community can be considered as a minority group within a hearing linguistic majority community, and, therefore, uses two languages (albeit of a different modality). The perception of the Deaf community as bilingual has been clearly recognised in the past decade of research on issues, sign language and Deaf awareness activism (Gregory, 1996; Kourbetis, 2000; Swanwick, 1999; Wilbur, 2000). Sign bilingualism, therefore, not only assumes that Deaf individuals are bilingual minorities (Grosjean, 2001), but also proposes that the most appropriate method of education is bilingual-bicultural education (Gregory, 1996).

However, models of bilingual education are challenged when implemented in relation to Deaf school students. These challenges are not always present in hearing bilingual education. First, Deaf school students do not always start school with an established L1 (i.e. the L1 can either be a sign language or a spoken language), and often it is debatable which of the two is the L1 or the L2. This is difficult to resolve as most Deaf school students are born to hearing parents, and have not grown up with any L1 (as conventionally defined for hearing children) (Mayberry, 1993). The small minority of Deaf school students, who come from Deaf families, can be considered as having a conventional L1 – although it may be developed under less than optimal circumstances (Ross & Newport, 1996). Despite the problem of justifying which (if any) of the two languages is the L1, one should bear in mind that Deaf people are naturally predisposed to visual communication, as this mode is compatible with the way they perceive the world (Mahshie, 1997). Sign language, because of its visual modality, offers access to a natural fully-fledged language to Deaf people. Therefore, sign language holds a special position in the education of Deaf school students (Paul, 2001).

Second, even if sign language is introduced in formal Deaf education, there is an important issue to overcome. Sign languages do not, as yet, have a written form,¹ and can be used in the context of education mainly for their communicative value (Kourbetis, 2000; Mayer & Akamatsu, 1999). Deaf people become literate through the language of the hearing community to which they belong. In other words, Deaf people are bilingual, but not biliterate. Indeed, L2 acquisition for Deaf people is almost always the acquisition of reading and writing.

Third, the field of sign linguistics is relatively unexplored compared to the linguistics of spoken languages. This means that in the majority of the existing sign languages, even if introduced in schools for academic purposes, there is still a lot of discovering to be accomplished in terms of their linguistic features. Most of the exploration comes from American sign language and British sign language, but research is currently developing in sign languages, such as Irish sign language (Saeed & Leeson, 1999), Japanese sign language (Yasuhiro & Yuko, 2000), Nicaraguan sign language (Senghas & Coppola, 2001), Greek sign language (Antzakas, 2007), and others. Research has described some common characteristics among sign languages, but it is still debatable whether there are specific features due to the modality. The most well attested sign language modality features have to do with the use of vision and space – which are absent in spoken language. It has been suggested that the use of vision and space forces sign languages to undertake some general common characteristics of a visual/concurrent nature as opposed to audio/sequential processing of spoken languages (e.g. non-manual features used for grammatical purposes, concurrency of verb and noun modifications, topicalisation preference, weak passive voice, tense and auxiliary verb system to name a few). However, the more research carried out in sign languages challenges the existence of the above features.

Lastly, it has been well-established that when Deaf students finish schooling, their average literacy level is at the borders of functional literacy i.e. at 8–10 years old (Turner, 2000). It has been argued that this is because the language of the curriculum and of literacy – the written form of the spoken language of the hearing majority – is a L2 to Deaf school students, but is not treated and taught as such (Grosjean, 2001; Powers *et al.*, 1998). It has also been argued that because sign languages do not have a written form or are not used in an academic discourse, there is no positive transfer of skills from sign language, even in the cases that it is L1 (i.e. in the Deaf children of Deaf parents). Studies have found that there is no strong relation between the communicative form of the L1 and the academic form of the L2 (Mayer & Akamatsu, 1999). This means that there is no particular advantage in academic achievement when having a L1 without literacy.² This becomes a serious disadvantage in the absence of a typical L1, as is the case for the majority of deaf students.

The above observations pose challenging theoretical and practical challenges for bilingual education when applied to Deaf settings. The theoretical issues revolve around which language qualifies as L1 and/or L2 for Deaf school students. The practical issues are concerned with how to use sign language in the classroom, since it has not been previously considered as a valid L2. This paper accepts sign language use in a bilingual context to teach writing.

Language Input in Bilingual Writing

In teaching an L2, the most common approach is to start via L2 reading and writing, making L2 writing identical to L2 itself (Bergstorm, 2002). This connects L2 to literate/academic contexts, and the boundaries between

literacy and communicative functions are not as well defined as in the case of L1. This difference is even more pronounced in the case of Deaf school students whose access to the spoken form of L2 (i.e. the spoken language of the hearing community) is limited, and for whom the written/visual mode is the only means of acquisition. In the context of Deaf education, L2 writing is often identical to L2 language acquisition. In order to explore language within Deaf education, we need to look closely at how bilinguals construct written texts.

There is no theoretical model for how bilinguals construct a text (Grabe, 2002). A model of how two languages interact could help in describing the process that a bilingual writer goes through in creation of a text. Such a model would also indicate how, where, and to what degree the L1 – or any language for that matter – can be used in teaching L2 writing. A potential model may be drawn from research studies of two kinds: those that compare *L1 and L2* writers, and those that research *L2* writers performing different tasks (the method used in the study presented here). These methods can provide complementary information, for example, the first can illuminate underlying cognitive processes, and the second, the effects of different strategies and techniques.

There are a number of studies in the bilingual education literature relevant to the current study. A first finding is that during writing many processes occur at the same time: decisions on information, meaning construction, language formation, editing the product, and constant monitoring of the process (Silliman *et al.*, 2000). L2 writing is even more complicated because some of the above processes are facilitated by the writer's L1, and other processes are facilitated by existing L2 skills. A second finding is that the less proficient an individual is in one of the languages – i.e. in L2 – the more use is made of the other – i.e. L1 – (James, 1998; Lightbown & Spada, 1993; Mayer & Akamatsu, 1999). A third finding concerns the relationship between oral skills in L1 and literacy skills in L2. Oral skills in L2 facilitate writing in L2, but oral skills in L1 may not (Kobayashi & Rinnert, 1992; Mayer & Akamatsu, 1999). This particular finding is extremely important for both bilingual education and deaf education, as it challenges the need for L1 involvement. However, some research has claimed that L1 is less involved in learning the form of L2, than it is in supporting a metacognitive level (including constructing meaning, negotiating meaning via meaningful communication, deciding on how much information, what kind of information and how to transmit the information) (Cook, 2001; Wang & Wen, 2002).

An important focus for research is the effect of different tasks on the performance of L2 writers. The two most typical tasks reflecting the bilingual experience in writing are *translation* and *direct composition*. These same two tasks are used in the present research, and are explored in the following section.

Translation versus direct composition

Translation and direct composition in various forms have been explored in various experiments on L2 writing. Both can reveal bilingual processes, and both have been studied in their own right, as well as by juxtaposition.

The present study is concerned mostly with the juxtaposition of their results with regard to bilingual writing. A brief review of previous research findings will set the framework for this study.

One of the classic studies in translation versus direct composition is that of Kobayashi and Rinnert (1992). They studied Japanese school students with English as L2 who were asked to write an essay in L2 (direct composition) and an essay in L1, which they were then required to translate into L2. The results showed that translation facilitated L2 writing, particularly in cohesion/coherence, content, organisation and syntactic complexity of the texts, but only for the low-proficiency school students. The higher-level school students did not benefit from translation, and produced better direct composition texts. The researchers analyse these findings as evidence that low-level school students can 'benefit from intervention and exploration of ideas in their first language especially in the prewriting and planning stages' (p. 204). The results of Kobayashi and Rinnert (1992) suggested that translation and direct composition facilitate different aspects of writing.

Another well-known study comparing translation and direct writing is Uzawa (1996), who studied Japanese school students with English as L2 in three tasks: direct writing in L1, direct writing in L2, and translation from L1 into L2. The results showed that direct writing in L1 and L2 did not differ in process, but since translation required more attention to language use, performance was higher. Once again, it was the low-level school students who seemed to benefit from the translation task; the author explains this as translation promoting more use of accurate and challenging language. The opposite happened with the direct L2 writing task, where the low-level school students used only words that were immediately accessible, thus lowering the level of the writing.

The findings on translation versus direct composition from these two articles are more or less in agreement: translation and the use of L1 seem to benefit the writing of low-proficiency school students. In general, L1 contributes to enhance planning, organising, and idea generating for these writers, and even contributes to the selection of linguistic material, such as vocabulary (Bergstrom, 2002; Cohen, 2000; Wang & Wen, 2002). These findings provide an important insight into assessing Deaf writers: instead of focusing only on the surface errors, we also have to look into the organisation and structure of the text. We need to apply methods that have been used with hearing bilinguals, and see if we can find evidence that Deaf writing shares characteristics with the writing of other bilinguals.

The studies discussed above have included L2 language proficiency as a variable. The study described here will only focus on the type of input independent of L2 proficiency.³ As discussed above, it is not always clear which language should be regarded as L2 in a group of Deaf school students, as their language experiences may vary enormously. The language proficiency of the students who participated in the study varied indeed: from a *strong balanced bilinguals* (i.e. good mastering of both languages, Greek sign language and written Greek), to *weak balanced bilinguals* (i.e. both languages not to a proficient standard), to *sign language dominant bilinguals* (i.e. where Greek sign language was more dominant than written Greek).⁴ The manipulation of

proficiency as a parameter showed that different bilinguals respond differently to language materials used in class (Koutsoubou, 2004; Koutsoubou *et al.*, 2006).

However, the present paper aims to study the effect of the linguistic input regardless of the deaf students' language proficiencies. We believe that such an approach has ecological validity, as Deaf learners with different language proficiencies are normally educated together in the same classroom. So, in a few words, even if research proves an interaction effect of language proficiency with language material, the reality of Deaf schooling does not take this parameter into consideration in practice. The present paper would like to explore what can realistically be manipulated in a bilingual situation – where the issue of bilingualism has not yet been acknowledged. Deaf students are still being approached with a monolingual attitude. Therefore, what can be manipulated easier by the practitioners is the language input rather than the proficiency of their students. The present study intends to reveal the effect of language input on deaf students' written texts.

The Study: Methodology

The study aims to answer the following research question: 'do different types of language input influence the quality of writing of Deaf school students?'

Due to the small size of the sample and the great variability in language proficiency within the Deaf population, the most appropriate design for the present study was a repeated-measures design, with the same participants tested on two different tasks: a translation writing task and a direct composition writing task. A repeated-measures design generally requires fewer participants since all data is derived from the same group, and a control group is not required. Also, the individual differences among the participants are cancelled because the data come from the same individuals in all measures. The main disadvantage of the repeated-measures design is 'order/practice' effects⁵ (Field, 2000; Robson, 1983). Due to this disadvantage, an effort was made to counterbalance and eliminate those effects from the present procedure.

The tasks: Translation and direct composition

Two tasks with different language input were used. The translation task was a story presented on video in Greek sign language. The direct composition task was a picture storybook without printed text. In both tasks, the Deaf participants were required to write the story. The aim was to compare the written stories elicited by the different tasks, and to decide which was more elaborate in *information, organisation and language use*.

These tasks are representative of the usual bilingual circumstances under which a person has to produce a written text. In *translation*, the meaning is presented in Greek sign language. Thus, sign language is explicitly involved in the writing process. The translation task may, therefore, be expected to show more interference,⁶ from sign language (i.e. sign language-induced errors). In

direct composition, there is no explicit source language involved in the writing. If similar errors, particularly sign language-induced errors, are found in the direct composition task, this may indicate that, in both situations, sign language is used to create meaning and form.

The materials used were two picture stories without words: 'Frog, Where Are You?' (Mercer, 1969) and 'The Grey Lady and the Strawberry Snatcher' (Bang, 1986). Both stories were of similar length, with 24 and 27 pictures, respectively. The two stories were presented in a booklet form for the picture task and were signed by a deaf native signer of Greek sign language for the video task. Both signed versions lasted around four minutes. Half of the participants received the Frog Story on video and the Strawberry Lady in pictures, and the other half received them the other way round, in order to control for story effects and counterbalance the order/practice effect of the repeated measures design.

The stories were piloted with a hearing bilingual, and both pieces of writing were of a similar length and degree of grammatical complexity.

Participants and Procedure

The study took place at three Deaf schools in Greece. Two were residential schools with a strong signing environment, and the third was linked to a school for hearing children.

The participants were all members of the last two classes of Lyceum (High school), and their age ranged from 17 to 23 years (mean age: 18.4 years). The numbers of participants from each of the three schools were: school 1 (15 participants), school 2 (seven participants), and school 3 (four participants) – in total 26 participants. Data collection took place in classrooms during normal lessons. Every student in each class took part. Of the 26 participants, only 20 provided data for the present study, as those who were hearing impaired ($n = 3$) and those who declined to be involved ($n = 3$) were excluded. Two visits were made to each class, one to collect data for the video task and the other for the picture task. The different classes of students were randomly presented the material.⁷ The order of the tasks within the classes was also randomised.

For the translation task, the class were told that they would see a short video story in Greek sign language, and that they should attend carefully to it, as they would be asked to write the story afterwards. Writing the story took approximately 20 minutes. For the direct composition task, each participant was given a picture-booklet of the story. They were asked to take a look at the story carefully for about four to five minutes. The booklets were then removed and they were given about 20 minutes to write the story.

All analyses were made using SPSS software, with the significance level at 0.05. ANOVA repeated-measures test was used. Data from three missing cases – due to absence – were substituted with the median value of the task on that measurement.

Table 1 presents background information about the participants and the tasks undertaken.

The 37 texts collected were balanced across task and source, as seen in Table 2.

Table 1 General information about the participants

Serial number of student	Age	Gender	School	'Frog Story'	'Strawberry Lady'
1	19	Male	1	Direct composition	Translation
2	18	Male	1	Direct composition	Translation
3	20	Female	1	Direct composition	ABSENT
4	18	Female	1	Direct composition	Translation
5	17	Female	1	Direct composition	Translation
6	18	Male	1	Direct composition	Translation
7	18	Female	1	Translation	Direct composition
8	23	Female	1	Translation	Direct composition
9	18	Male	1	Translation	Direct composition
10	19	Female	1	Translation	Direct composition
11	18	Female	1	Translation	ABSENT
12	18	Male	2	Direct composition	Translation
13	18	Male	2	Direct composition	ABSENT
14	18	Female	2	Translation	Direct composition
15	20	Female	2	Translation	Direct composition
16	18	Female	2	Translation	Direct composition
17	19	Male	2	Translation	Direct composition
18	18	Male	3	Direct composition	Translation
19	19	Female	3	Direct composition	Translation
20	18	Female	3	Direct composition	Translation

Table 2 Distribution of the stories across translation and direct composition

'Frog Story'		'Strawberry Lady'	
Direct composition	Translation	Direct composition	Translation
11	9	8	9

The written texts produced by the participants were compared [single factor (task) and two levels (direct composition and translation)] to explore whether there are differences at the *information level*, *organisation level* and *grammatical level*. The hypothesis is:

The direct composition and translation tasks will produce texts differing in quality and quantity of information, organisation and grammar.

Methods of Text Analysis

The stories were analysed on four hierarchically connected levels, starting from the highest and moving towards the lowest: *information*, *organisation*, *text characteristics* and *error analysis*.

The **information** level was measured according to amount and type. *Amount* measured whether the stories included all basic structures of a narrative (setting, reason, action, and closure), and the *type* compared use of descriptive information (i.e. event report), and evaluative information (i.e. comments added by the writer about events and characters) (Bamberg, 1997; Labov, 1997; Yoshinaga-Itano & Downey, 1996).

The **organisation** of the stories (i.e. how the above information was structured) was measured through the use of tree diagrams (Langer, 1986). Tree diagrams show how the propositions of the story connect via specific linguistic indicators that reveal relations. For example, the connector 'but' reveals adversative relation; the connector 'because' reveals explanation relation; 'because of' reveals cause. These connections take place on hierarchical levels, with various levels of subordination: Level 1, Level 2, Level 3, and so on. The tree diagrams, thus, show how tightly connected the story is by measuring the depth in terms of numbers of levels. The tree diagrams also show how elaborated a story is, from the number of different relationships that appear between clauses.

Text characteristics are widely used for the analysis of writing and are reliable indicators of the quality of writing (Fraser, 2001; Silliman *et al.*, 2000). In this study, the following measures were used: number of words in the text; number of clauses in text; clauses per sentence; sentence length (number of words in a sentence); subordinate clauses; co-ordinate clauses,⁸ and sentence complexity (use of adverbials, adjectives, rare vocabulary, and complex structures in general).

The last area of analysis was the **type of errors** found in the stories. These were classified within a bilingual typology: omission, overinclusion, misselection, misorder and blends (James, 1998). Orthographic errors, as well as errors in vocabulary, grammar and discourse, were coded.

An example of a written story analysed

The analysis of the texts on the various levels was a complex task, and it is even more complex to present examples of analysis in English. We make an effort here to present an illustrative example of how the texts were analysed. All texts were initially segmented in clauses and then analysed in the four levels of *information*, *organisation*, *text characteristics* and *error analysis*.

The following story belongs to a Deaf female student of the first school, it was produced under the video task and the topic story was 'The Grey Lady and the Strawberry Snatcher'. We present the transcription of the English translation; however, the real transcription took place on the Greek

texts.⁹ For this reason, it is difficult to present the analysis particularly of *text characteristics level and error analysis level*, which are only described.

Step 1: Translation into English of the Greek written story

The Lady went to the grocer-man to buy the strawberries she paid and left. She walked in the street, suddenly some boy is strange his face like is witch. He followed the girl and wants to take the strawberries. The lady was running and came the bus got in. He is sad because he wants to eat but doesn't have. Some other time again he saw a lady who has the strawberries was running and followed but lady disappeared in the wood. But is boy disappointing because not is-found the strawberries. Some day he saw in the wood there are strawberries, ate and happy. The lady went to her house and gave to all her family and ate.

Step 2: Segmentation of story in clauses on which the analysis of information and organisation was based

Clause is the minimum language unit with a meaning. The clause is defined primarily by its verb and the explicit or implicit subject. Unlike English, where a clause can have two forms of verbs, in Greek because of the absence of infinitive verbs, a clause could be as small as a single verb. The above story, therefore, was segmented as follows:

- | | |
|-------------------------------------|---|
| (1) The Lady went to the grocer-man | (18) Some other time again he saw a lady |
| (2) to buy the strawberries | (19) who has the strawberries |
| (3) she paid | (20) was running |
| (4) and left. | (21) and followed |
| (5) She walked in the street, | (22) but lady disappeared in the wood. |
| (6) suddenly some boy is strange | (23) But is boy disappointing |
| (7) his face like is witch. | (24) because not is-found the strawberries. |
| (8) He followed the girl | (25) Some day he saw in the wood |
| (9) and wants | (26) there are strawberries, |
| (10) to take the strawberries. | (27) ate |
| (11) The lady was running | (28) and happy. |
| (12) and came the bus | (29) The lady went to her house |
| (13) got in. | (30) and gave to all her family |
| (14) He is sad | (31) and ate |
| (15) because he wants | |
| (16) to eat | |
| (17) but doesn't have. | |

Step 3: Coding amount and type of information

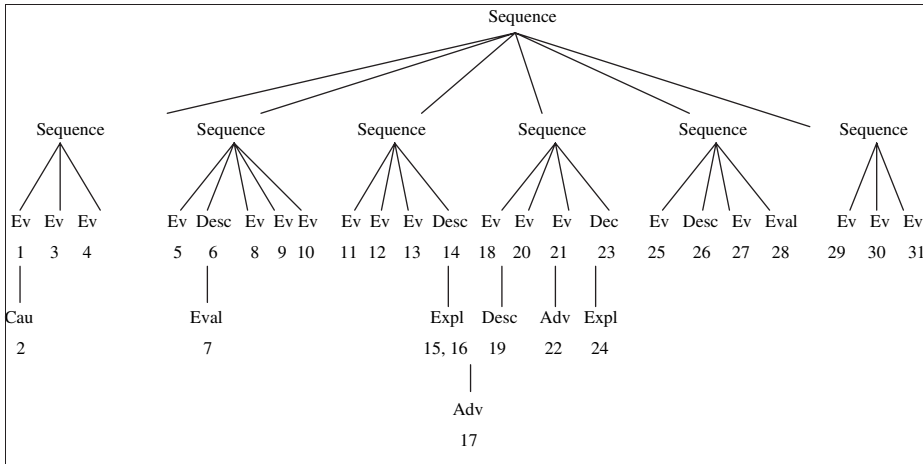
The numbers of clauses are inserted next to the information in this transcription table, (provided the information is present in the written text).

This is the transcript table for the above story (there is a similar table for the 'Frog story' texts).

<i>Story grammar</i>	<i>Basic story lines</i>	<i>Descriptive information (action, events, descriptions)</i>	<i>Affective information (manner/characters' interaction and dialogues/inner state and thoughts)</i>
SETTING +	<ul style="list-style-type: none"> Lady buys strawberries + 	<ul style="list-style-type: none"> Time Place (at grocer's shop) 1, 2 Scene (grocer prepares the box/pays) 3, 4 	
REASON +	<ul style="list-style-type: none"> Man follows her + Man tries to snatch box - 	<ul style="list-style-type: none"> Time (while she was walking/after she left) 5 Place Scene A strange man follows her/8 Woman is ignorant/ 	<p>Man—strange look/ 6, 7</p> <p>Man—hungry, wants to eat strawberries 9, 10</p>
ACTION +	<ul style="list-style-type: none"> Man starts chasing woman + She always manages to escape + 	<ul style="list-style-type: none"> Time (then) Place (bus/woods/among, behind etc. trees) Scene <i>Lady runs to bus/ 11, 12</i> <i>Bus leaves/ 13</i> <i>Bus arrives to woods/</i> <i>Man chases woman into wood/</i> <i>Woman escapes/</i> <i>Man always behind/ 18, 19</i> <i>Woman hides behind tree/ 20</i> <i>Man spots her/ 21</i> <i>Woman climbs tree/ 22</i> <i>Man spots her/</i> <i>Man loses her/</i> 	<p><i>Lady—frightened/ in hurry</i></p> <p><i>Man sad/ 14, 15, 16, 17</i></p> <p><i>Man—puzzled/ 23, 24</i></p>

<i>Story grammar</i>	<i>Basic story lines</i>	<i>Descriptive information (action, events, descriptions)</i>	<i>Affective information (manner/characters' interaction and dialogues/inner state and thoughts)</i>
Closure +	<ul style="list-style-type: none"> • He eventually finds raspberries and forgets her + • She arrives home and gives strawberries to her family + 	<ul style="list-style-type: none"> • Time 25 • Scene <i>Man finds a raspberry bush/26 Starts eating and forgets the lady/27</i> • Time • Place (Woman arrives home) 29 • Scene <i>Gives all family the strawberries/ 30, 31</i> 	<i>Man-happy/ excited/ 28</i>
Total 4/4	Total 5/6	Total 20/31	Total 11/31

Step 4: Coding the organisation of the stories: Tree diagram showing the organisation of the sample story



Step 5: Exploring text characteristics in the texts

As explained above, a number of measurements took place within clauses, between clauses and on whole text level, such as number of

words, number of clauses, co-ordination, subordination etc. (for full list see Section 5).

Step 6: Coding for error analysis

	<i>Level</i>	<i>Substance</i>	<i>Text</i>		<i>Discourse</i>
				Grammar	Lexis
		Spelling	Noun Verb Adjective Adverb Preposition; Conjunction; Article Pronoun	Vocabulary choice	Cohesion/ coherence
Modification					
Omission					
Overinclusion					
Misselection					
Misorder					
Blend					

The English translated story cannot be used here as the errors categorised in this table came from the original Greek text. Actual examples are difficult to give without reference to the original language of the text, and this is beyond the scope of the present paper.

Results

There were a number of statistical tests carried out, the majority of which did not produce statistically significant results. More specifically, for the information level there were four tests of which none was significant; for the organisation level there were four tests of which two were significant; for the text characteristics there were seven tests of which one was significant; for error analysis there were 55 tests of which three produced significance. However, these significant results are interesting to discuss, not only because they are predicted by theories on L2 writing, but also they may indicate areas for further research with larger samples of Deaf writers.

Information level

Table 3 Descriptive statistics for amount and type of information in written stories in direct composition and translation tasks

<i>Amount and type of information in written stories</i>	<i>Direct composition</i>		<i>Translation</i>	
	<i>Mean</i>	<i>sd</i>	<i>Mean</i>	<i>sd</i>
Story grammar	0.76	0.26	0.76	0.29
Basic story lines	0.64	0.28	0.67	0.35
Descriptive information	0.86	0.09	0.83	0.15
Affective information	0.13	0.09	0.15	0.15

On the level of information, there were no significant differences between the two tasks. Translation and direct composition produced the same amount and type of information (see the descriptive statistics in Table 3).

Organisation level

Organisation measurements showed some significant differences between the two tasks. More specifically, on the measurements of the second and fourth level of organisation of the tree diagrams, the translation material produced significantly higher scores than the direct composition material (see the descriptive statistics in Table 4). That is, the written stories were significantly more elaborated in the translation task compared to the direct composition task. For the second level of organisation, the main effect of the material was: $F(1, 19) = 11.494$, $p = 0.003$ (see Table 5); these results are represented

Table 4 Descriptive statistics for story organisation (second and fourth level) in direct composition and translation tasks

<i>Organisation level</i>	<i>Direct composition</i>		<i>Translation</i>	
	<i>Mean</i>	<i>sd</i>	<i>Mean</i>	<i>sd</i>
Story organisation level 2	3.50	1.14	4.20	1.23
Story organisation level 4	2.20	3.25	4.35	3.00

Table 5 Comparisons of translation versus direct composition for story organisation (second and fourth level)

<i>(I) Material</i>	<i>(J) Material</i>	<i>Mean difference (I–J)</i>	<i>se</i>
Second level of story organisation			
Translation	Direct composition	*0.70	0.20
Fourth level of story organisation			
Translation	Direct composition	*2.15	0.65

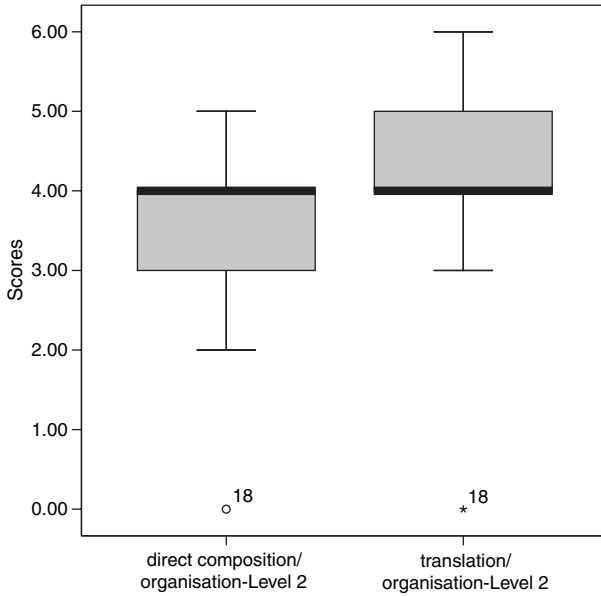


Figure 1 Story organisation (second level) elicited by translation and direct composition

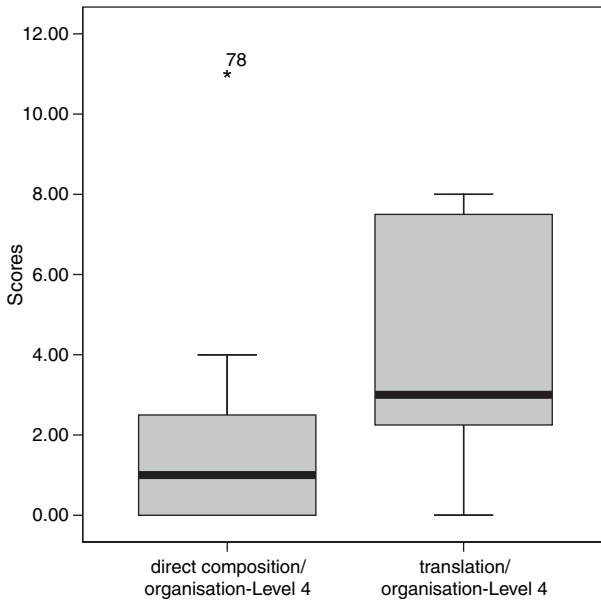


Figure 2 Story organisation (fourth level) elicited by translation and direct composition

graphically in Figure 1. For the fourth level of organisation, the main effect of the material was: $F(1, 19) = 10.840, p = 0.004$ (see Table 5 and Figure 2).

Table 6 Descriptive statistics for number of subordinate clauses in texts in direct composition and translation tasks

<i>Text characteristics</i>	<i>Direct composition</i>		<i>Translation</i>	
	<i>Mean</i>	<i>sd</i>	<i>Mean</i>	<i>sd</i>
Number of words in the text	107.65	85.83	110.45	59.19
Clauses per sentence	2.10	0.79	2.08	0.79
Number of clauses in text	23.95	16.09	27.70	15.7
Sentence length	9.07	3.58	8.54	3.09
Subordinate clauses	2.60	4.45	4.00	4.15
Co-ordinate clauses	4.90	7.23	5.55	5.64
Sentence complexity	0.45	0.62	0.55	0.62

Table 7 Comparisons of translation versus direct composition for number of subordinate clauses in texts

<i>(I) Material</i>	<i>(J) Material</i>	<i>Mean difference (I–J)</i>	<i>se</i>
Translation	Direct composition	*1.40	0.63

Text characteristics

Only one of the seven text characteristics measures produced significant results: the amount of subordinated clauses. The translation task produced more subordination in writing than the direct composition (Tables 6 and 7, [$F(1, 19) = 4,874, p = 0.040$] and Figure 3).

Error analysis: Types of errors

In relation to types of errors, direct composition produced better results than translation.

First, as seen in Table 8, the translation task in total produced more omissions of grammatical items in the texts than direct composition.

This difference of omitting grammatical words approached significance [$F(1, 19) = 4.226, p = 0.054$] (see Table 9 and Figure 4).

The category of 'omission errors' includes omission of function words: prepositions, verbs of being, articles and conjunctions. Two subcategories yielded significant results: *omission of prepositions*, and *omission of verbs*.

Within the subcategory of 'omission of prepositions', the translation task produced significantly more instances of preposition omissions than direct composition [$F(1, 19) = 7.225, p = 0.010$, see Tables 10 and 11]. In the 'omission of verbs' subcategory, the overwhelming majority of the omitted verbs fell into a broad category of stative verbs (verbs of being, i.e. to be, to have, to appear) and communicative verbs (verbs of saying, i.e. to ask, to reply, to think, to say)

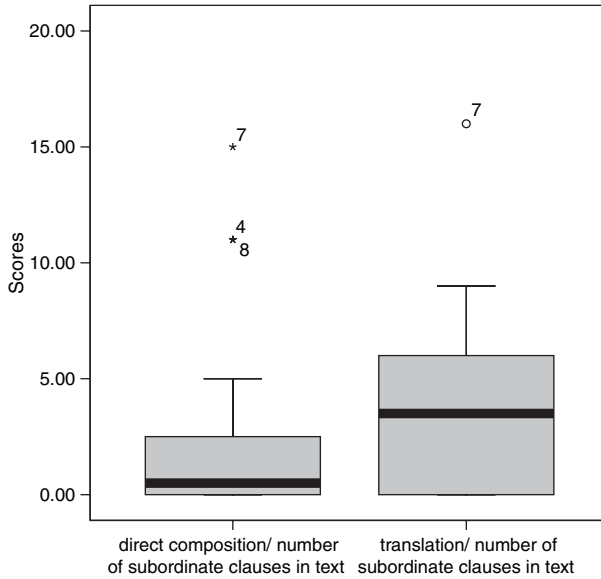


Figure 3 Number of subordinate clauses elicited by translation and direct composition

Table 8 Descriptive statistics for omissions of grammatical items in direct composition and translation tasks

	<i>Mean</i>	<i>sd</i>
Direct composition/grammar-omission	2.85	2.68
Translation/grammar-omission	5.05	3.80

Table 9 Comparisons of translation vs. direct composition for omissions of grammatical items

<i>(I) Material</i>	<i>(J) Material</i>	<i>Mean difference (I-J)</i>	<i>se</i>	<i>Sig.</i>
Translation	Direct composition	2.2	1.07	0.056

[$F(1, 19) = 10.231, p = 0.050$, see Table 11]. From the descriptive statistics (Table 10) we can see that there were three times more verb omissions in the translation task than the direct composition.

Finally, on the error analysis level, there are interesting findings with respect to orthography, as Deaf school students' orthography has not been noted as an area of major difficulty (Musselman & Szanto, 1998). When orthography was analysed there was a significant task effect on 'misselection' errors. By misselection errors, we mean substituting a letter in a word with another letter (for example 'fear' could be written 'vear' misselecting 'v' for 'f').¹⁰ The

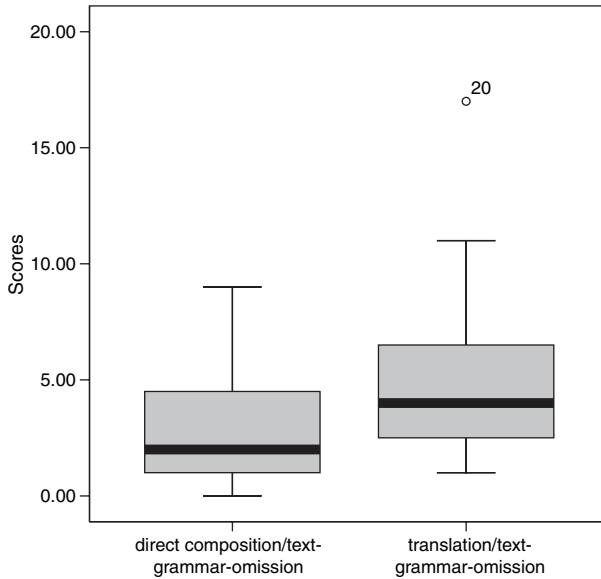


Figure 4 Omission errors of grammatical items in text level elicited by translation and direct composition

Table 10 Descriptive statistics for omission of grammatical items in the text (prepositions and verbs)

	<i>Direct composition</i>		<i>Translation</i>	
	<i>Mean</i>	<i>sd</i>	<i>Mean</i>	<i>sd</i>
Omission of preposition	0.35	0.67	1.20	1.31
Omission of verbs	0.40	0.88	1.10	0.85

Table 11 Comparisons of translation vs. direct composition in omitting grammatical items from the text (prepositions and state verbs)

<i>(I) Material</i>	<i>(J) Material</i>	<i>Mean difference (I-J)</i>	<i>se</i>
Omission of preposition			
Translation	Direct composition	*0.85	0.29
Omission of verbs			
Translation	Direct composition	*0.70	0.21

results showed that it was the direct composition task that produced more orthographic misselections (see means in Table 12), and this difference is statistically significant [$F(1, 19) = 5.721, p = 0.027$; see Table 13 and Figure 5].

Table 12 Descriptive statistics for orthographic misselection

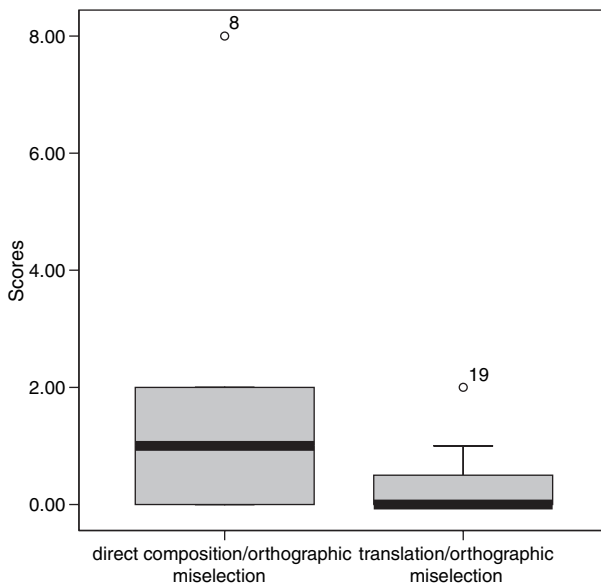
	<i>Mean</i>	<i>sd</i>
Direct composition/orthographic misselection	1.20	1.82
Translation/orthographic misselection	0.30	0.57

Table 13 Comparisons of translation versus direct composition in orthographic misselections

<i>(I) Material</i>	<i>(J) Material</i>	<i>Mean difference (I-J)</i>	<i>se</i>
Translation	Direct composition	* - 0.85	0.37

Summary of quantitative results

In general, the two tasks did not produce dramatic differences in writing in terms of information, organisation, text characteristics and error analysis. The information level was the same in amount and type for both translation and direct composition. However, deep structure at the organisation level was sensitive to the two different tasks. The deeper levels of the tree diagrams (second and fourth) were more elaborated in the translation task than in direct composition. On the level of text characteristics, the translation task produced significantly increased numbers of subordinate clauses in written texts compared to the translation task. Lastly, on the error level, the texts showed sensitivity on omission of grammatical words and substitution in orthography. Specifically, there were more omissions of prepositions and 'being' and

**Figure 5** Orthographic misselection in translation and direct composition tasks

'saying' verbs in the translation task, while there were more orthographical errors (substituted letters) in the direct composition task.

Discussion

The small number of significant differences indicates that translation and direct composition do not have a dramatically different effect on deaf writing. The small sample size may be responsible, and replication of the experiment with larger deaf samples may reveal more significant differences. However, the findings of the quantitative analysis are in accord with the literature on bilingual writing, and, therefore, raise interesting issues.

Returning to the research question posed at the beginning: 'do different types of language input influence the quality of writing of Deaf school students?' we can now explore the extent to which it was answered, and how our findings link to the international literature on bilingual writing.

The *variety* of effect which language input had on deaf writing shows that the answer to the research question is not straightforward. Translation from sign language facilitated certain aspects of writing, such as organisation of the stories, text characteristics, and, interestingly, more correct orthography. There were instances, though, where translation resulted in poorer text quality because of increased omission of various function words. This variety of results shows that translation facilitates *different* aspects of writing. Because of this, each of the findings will be discussed separately.

The first positive effect of translation from sign language in comparison to direct composition was found at the deeper levels of story organisation (improving text structure on the second and fourth level of the tree-diagrams). This result is compatible with other findings in the literature on the effects of translation and L1 medium on bilingual writing (see above). Translation and L1 use have been found to facilitate planning and organisation of the L2 written text (Kobayashi & Rinnert, 1992), and this was corroborated in our study. It is possible that deaf writers used sign language in order to organise ideas and language structures more successfully and in a more elaborate manner.

However, we also need to mention that despite the agreement with other research findings, it is not completely clear that it is sign language medium that facilitated the organisation of the written stories. It could be that the Greek sign language material provided a ready-made narrative, structured by the deaf narrator. Our deaf writers only needed to keep *in memory* the initial structure of the signed story and reproduce it as closely as possible. Memory serves a different function in a translation task than in a direct composition task; in the former case, the internal organisation is provided, but in the latter, memory of the pictures does not provide any scaffold.

This factor (i.e. memory) may also explain the omission of function words in the translation task. This occurred at the error level, which is the surface level of the text. The translation task resulted in greater omission of function words (such as prepositions and verbs of state/being/communication) than the direct composition material. Here it is clearer than in the previous case that memory maintains both the meaning and form of the G sign language story, as both

these error types are examples of sign language interference (Greek sign language, like many sign languages, lacks prepositions and copula (Anderson, 1993)). This result is also in agreement with relevant research on the writing of bilingual hearing populations. All translation tasks are much more prone to L1 interference errors. In addition, it has been suggested that written translations are even more prone to L1 transfer errors because writing is a demanding task, requiring greater reliance on the L1 (Malakoff & Hakuta, 1991).

This finding of L1 interference is balanced by the improvement in the general text characteristics of the written product in the translation task. In our case, the sign language translation task increased the use of subordination, an elaborate linguistic structure frequently used as an index of language complexity in written texts. This is also the effect of translation/L1 medium which, according to other research, promotes more elaborate and adventurous use of language (Uzawa, 1996). This does not necessarily mean that the attempts to use such sophisticated structures are always correct. Often more grammatical errors may occur because the writer is able to be more ambitious when translation is available as a strategy. Translation and use of L1, therefore, can have both positive and negative effects, and this paradox is manifested quite well in our study: the 'keeping-up-the-standards' approach (Larios *et al.*, 2002) may help in organising information before writing in L2, and in attempting more subordination, but it also results in linguistic interference and errors.

Finally, another interesting result of the effect of language input is the effect on orthographic processing in Deaf writing. Orthography for Deaf writers is not an area of challenge and underachievement (Musselman & Szanto, 1998). Hearing bilingual writers frequently make spelling errors because hearing activates phonological processing. Indeed, this is one of the biggest distinctions between Deaf bilinguals and hearing bilinguals (Fabbretti *et al.*, 1998). This is relevant to issues of phonological versus visual processing in the development of literacy, but a discussion of this is beyond the scope of this paper. In our study, the direct composition task produced more spelling errors than the translation task with regard to 'misselection' errors, i.e. selecting the wrong letter to spell a word rather than other types of spelling errors, such as 'overinclusion' or 'omission'. It means that the writers *knew* that there was a phoneme/grapheme there (in the hearing or the visual sense), but did not know what it was.

This result could be an indication that direct-composition may activate phonological processing, the side effect of which is spelling errors. The translation, conversely, may have activated more visual processing, which does not result in too many spelling inconsistencies. Whereas this is an interpretation of the presence or absence of spelling errors, unfortunately it is not a strong interpretation of why this type of spelling error (i.e. 'misselection') should occur in direct composition. For example, it could as well be that different tasks should result in different types of misselecting errors (i.e. 'phonological' errors in direct composition task and 'visual errors' in translation from sign language task). However, most 'visual' errors,¹¹ and most 'phonological' errors,¹² arose in the direct composition task, thereby complicating any straightforward conclusion on task processing with regard to

orthography. Finally, not all spelling errors are easy to classify as phonological or visual (e.g. one may argue on the degree of visual or phonological similarity of many letters/phonemes).

Although it seems that the explanation of this result could lie in the nature of sign language, more research needs to be conducted not only in the field of deaf writing, but also in the field of psycholinguistics, where deaf participants may offer valuable insight into phonological and visual writing processing. Also, more research needs to be conducted on the sign linguistics to investigate the role of lip-reading and mouthing during writing. It could be that lip-reading during sign language reduces the frequency of spelling errors in translation task, which may reflect the potential of some phonological information from lip-reading. All the above fields are open to investigation.

As a last comment, we would like to reiterate that the results, although coming from a small and heterogeneous sample of Deaf participants, are in line with the general literature on translation and L1 use in bilingual writing of hearing populations. This has two implications. The first, at the micro-level, is that since writing is a multifaceted activity with many levels operating in parallel – planning and organising ideas, and deciding on the language structures – the language input used in teaching L2 writing may facilitate some of these aspects but not others. Therefore, educators should be aware of the potentials and limitations of tasks and materials they use in teaching. The second implication, at the macro-level, is that Deaf writing can be considered as being within the frame of bilingualism, and that deaf writers have, in many respects, the profile of bilingual writers. Deaf writers respond in the same manner to tasks as hearing bilingual writers undergoing the same processes and making the same errors. Greater understanding of Deaf writing, therefore, is gained from being situated within the bilingual context, where a great amount of research has been carried out and many phenomena have been explored and explained. Research on bilingual writing may help to explain aspects of Deaf writing and may offer new approaches to combating deaf underachievement in literacy.

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Notes

1. It must be noted here that there have been efforts to create written forms of signing, e.g. sign writing in USA (Writing by hand, 1997), or Nicaragua (Brooks, 1996). Nevertheless, the existence of a sign written form is still experimental and cannot be regarded as integral to any known sign language.
2. It is worth noting here that Deaf students are not unique in this situation and there are a lot of languages that have not developed a written form (Robinson & Gadelii, 2003).
3. The effect of proficiency in both Greek sign language as well as written Greek has been explored in a complementary study (Koutsoubou, 2004).

4. These are assessments given by their teachers when asked to comment on their students', Greek sign language and written Greek level. There is an absence of research and reference on formal literacy levels of Greek Deaf students and comparisons cannot be drawn with their Greek hearing peers. However, low literacy and language levels are acknowledged by many researchers in Greek Deaf studies (Lampropoulou, 1993; Mihailidou, 1997; Mparlou, 2000).
5. This refers to the order of presentation of the material where the first material would offer a 'practice' for the second.
6. Interference is the transference of elements of one language to another at various levels, i.e. phonological, lexical, grammatical (Mackey, 2000). Interference is most often discussed as a source of errors (negative interference) although there can be positive interference.
7. When a class was presented with the 'Frog story' video they were then given the 'Strawberry lady' booklet, whereas the next class was given the 'Frog story' booklet and the 'Strawberry lady' video and so forth.
8. Subordination as well as some forms of elaborated co-ordination is strongly connected with the deeper levels of organisation of the written stories.
9. For this reason there are discrepancies on all levels: clause segmentation, translation of errors and so on. The present example serves only as an illustration of the concept of our analysis.
10. In the Greek text that would appear as misselection of the graphemes 'φ' and 'β' (i.e. φ = f and β = v):
11. Such as misselecting between the letter pair 'ξ' and 'ζ'. These two Greek letters look similar.
12. Such as misselecting between the letter pair 'κ' and 'χ'. The two Greek letters sound similar.

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