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Writing Abilities of Grade 1-9 Japanese-English Bilinguals: Linguistic Interdependency and AGE, LOR and AOA

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海外在住小中学生の日英作文力
－言語相互依存性と年齢・滞在年数・入国年齢要因－

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Keyword: Biliteracy development, writing, linguistic interdependency, AGE, LOR, AOA

Abstract

Developing literacy skills in both majority and the heritage languages is critically important for culturally and linguistically diverse students. Aiming to support the biliteracy development, this study analysed compositions written under the same topic collected from 240 bilingual students. It was revealed that while sentence width, lexical

and grammatical error rates are language specific, qualitative aspects of writing as well as fluency, lexical complexity and sentence depth present moderate correlations across English and Japanese, and conventional error rates a low correlation. These findings were further analysed in relation to the writers' age, age of arrival to and the length of residence in the second language environment.

要　旨

文化的また言語的に多様な環境で育つ子どもたちにとって、滞在国の主要言語と継承語両方での書く力の習得は喫緊の課題である。そうしたバイリテラシーを支える教育をめざし、本稿では小学1年から中学3年までの日英バイリンガル児童・生徒240名を対象に二言語同一のテーマで作文を書いてもらい、二言語の共有面と個別面について分析した。文の広がりと語彙・文法上の誤用が言語に特有の発達を見せるのに対し、質的な側面と産出量、語彙の多様性、構文の深さについては中程度の相関が、また表記の誤用については弱い相関が認められ、相互依存的関係にあることが確認された。さらにこうした関係性について、年齢、第二言語環境での滞在年数と到着時年齢という3つの要因それぞれとどのような関係にあるか詳しく分析した。

Background of Our Study

OECD International Migration Outlook (2013) reported that more than 20% of the entire population in Canada were foreign born in 2011, and according to the 2006 Census of Canada more than one in ten spoke languages other than the two official languages of Canada at home. Such is not a situation peculiar to Canada but is a trend found across the world today (Baker, 2011). With such an increase in the number of migrants, there is a huge flux of students with culturally and linguistically diverse backgrounds who present needs for special educational support.

Many of these culturally and linguistically diverse (CLD) students face the hard task of acquiring literacy skills in their second language (L2), which is often their weaker language. They are also likely to receive much less support within the home for developing the dominant societal language compared to their monolingual peers. Given the importance of acquiring writing

abilities in the dominant language of society together with an increasing demand for competent bilingual/biliteral individuals, it is of urgent need to establish educational practices that will lead to the development of literacy skills in both languages for bilingual students. This is both desired on the part of the learners as well as society which would benefit greatly from the linguistic resources these students bring.

It has been pointed out repeatedly how crucial it is to have bilingual perspectives when studying literacy development in CLD students (e.g. Butler, 2011; De Bot, Lowie & Verspoor, 2007; Gort, 2006; Reyes, 2012). Indeed, as rightly pointed out by Grosjean (1989, p.3), "the bilingual is NOT the sum of two complete or incomplete monolinguals" and the same applies to biliterate writers; they are not the sum of two monolingual writers in one mind. It would be very misleading to judge the writing ability of CLD students by looking only at their writing in one language. Their writing abilities need to be evaluated holistically through a bilingual approach, but research from such a perspective is still scarce.

Our research, part of which is reported in this paper, was motivated to respond to the call for sound pedagogical practices to support biliteracy development and empirical studies to support such practices. We aim to clarify the aspects of writing skills that support biliteracy development across languages in order to efficiently support biliteracy development in CLD students rather than developing literacy skills in L1 and L2 separately.

Literature Review

In this section, we will first review Cummins' influential theories of the interdependent nature of bilinguals' linguistic abilities, with a clarification of the term "transfer" used in previous studies. We will then review the few studies that have identified some of the aspects in writing that are interdependent across languages from those that are language specific. We also identify the factors that have been shown to affect the relationships between L1 and L2 writing abilities in the previous studies.

Linguistic Interdependency and Concept of Transfer

Since Cummins (1981) proposed the linguistic interdependency principle, a plethora of studies has confirmed the interdependent nature between languages of CLD students (for synthesis, see Cummins, 1991; Cummins, 2000). Based on the evidence from these empirical investigations, Cummins (2000) argued:

> In order to account for the evidence…, we must posit a common underlying proficiency (CUP) model in which the literacy-related aspects of a bil ingual's proficiency in L1 and L2 are seen as common or interdependent across languages. In other words, the common underlying proficiency refers to the cognitive/academic knowledge and abilities that underlie academic performance in both languages. (2001, p. 173)

Cummins' CUP model hypothesises a differentiated degree of transfer across language proficiencies; some deep level aspects are easily transferred across languages while other surface level aspects that are language specific are not easily transferred. Cummins (2009, p.25) proposed five types of transfer, namely transfer of: conceptual elements, metacognitive and metalinguistic strategies, pragmatic aspects of languages use, specific linguistic elements, and phonological awareness.

Clarification of the term "transfer" is necessary as this term has been employed in different ways in bilingual education and second language acquisition (SLA) research. In the former, it has focused on the use of shared resources, while in SLA writing literature the focus has been on how lexical and grammatical knowledge in one language affects that of the other (Francis, 2012, p.50), thus focusing on negative transfer in most cases and positive transfer only in the case where the two languages are typologically very close to one another (Dressler and Kamil, 2006).

In this study, our focus is not to document the incidences where writers apply grammatical knowledge from the L1 onto L2 writing where they should

not, but rather, how writers make use of language resources they have in one language to support the other, and thus will use the term "transfer" in the former meaning.

Language Interdependent Aspects and Language-Specific Aspects

The studies that are devoted to distinguishing language interdependent aspects from the language specific aspects in literacy abilities are scarce especially in the area of writing development. We have identified seven such studies, which will be reviewed in this section.

One of the writing aspects that all of the studies seem to agree on as being interdependent across languages is what can be called higher order skills in writing. For example, Lanauze and Snow (1989) studying G4 and G5 Spanish-English bilingual Puerto-Rican students found that those students who were better in their L1 wrote semantically more complete essays not only in their L1 but also in their L2. Similarly, Davis, Carlisle, and Beeman (1999) found discourse elements correlated across Spanish and English. Such linguistic interdependency is not limited to cognate language sets, but also extends to non-cognate language sets such as Náhuatl and Spanish (Francis, 2000), and further to language sets that come from different writing systems (Ikuta, 2002). Schoonen et al. (2003) and Schoonen, van Gelderen, Stoel, Hulstijn, and de Glopper (2011) illustrated how metacognitive writing knowledge together with fluency mediates the association between L1 Dutch writing and English as foreign language writing among grade 8-10 students.

When it comes to lexical knowledge and how it is related across the two languages of bilinguals, these studies present mixed findings. While Francis (2000) and Ikuta (2002) found that some aspects of lexical knowledge were interdependent across languages even with non-cognate language sets, Davis et al. (1999) found no such relationship in the use of long words between Spanish and English. Lanauze and Snow (1989) found interdependency in linguistic variety only with the students who were poor writers in the L2 but good writers in L1. The authors argue that such linguistic transfer does not occur for students whose L1 is poor, and also for students whose L2 is well-developed. For

the latter group, the authors speculate, the two systems have become independent of one another.

For aspects like grammatical complexity and accuracy, the studies that investigate positive transfer of grammatical abilities in general are very limited although there are plenty of studies that have investigated the influence of L1 on L2 grammatical errors in the area of L2 development. This may be due to the fact that the focus of the studies have been exclusively on L2 development, and in that sense the knowledge of L1 has been treated as noise or even as a negative influence in L2 development. People have not paid due attention to how grammatical knowledge could develop hand in hand across languages, Ikuta (2002) and Hulstijn (2011) being the rare exceptions, and these two present seemingly discrepant findings. On the one hand, Ikuta found no correlation in grammatical complexity and accuracy in Japanese and Portuguese writings of Brazilian students studying their L2 Japanese. On the other hand, Hulstijn, who studied grade 8 to 10 Dutch students learning L2 English, concluded that grammatical knowledge as well as lexical knowledge and their transferable nature accounted for the interdependency in literacy skills between Dutch and English. This conclusion in regard to grammatical knowledge in particular seems to conflict with Ikuta's (2002) finding that grammatical knowledge is not interdependent across languages. There are two possible explanations that account for this discrepancy. One is the distance between the language sets that their students were dealing with. In Ikuta's study, the students were trying to acquire writing skills in Japanese which were typologically and orthographically very different from their L1 Portuguese, while the students in Hulstijn's study were studying a language that was typologically similar to their L1 and written in the same alphabetic writing system. The other possible explanation is that the participants in Ikuta's study were studying Japanese in an L2 context with not much support for their L1 literacy development, while the students in Hulstijn's study were studying English as a foreign language, with plenty of support for their L1 literacy attainment. Indeed, when analysing the development of literacy skills, various factors come into play. We will now turn to the factors which

affect relationships between writing abilities in the two languages of bilingual students.

Factors Affecting the Relationships between L1 and L2 Writing Abilities

The learner's L2 linguistic knowledge and L1 literacy knowledge have been repeatedly pointed out in the literature as accounting for individual differences in learners' literacy attainment in L2 (e.g. Bialystok, 2001; Cummins, 1991), though not many of these studies have investigated the domain of writing. Furthermore, the relationships between L2 oral proficiency and L2 literacy attainment (Geva, 2006), as well as that of L1 oral proficiency and L2 literacy attainment have been discussed (see Genesee, Geva, Dressler, and Kamil, 2008 for a review).

With a specific focus on writing development in bilingual children, Ikuta (2006) observed that L2 writing abilities in terms of fluency, accuracy, lexical and syntactical complexity, and content and organisation measures improved as writers' length of residence (LOR) lengthened. Also illustrated in the same study was how writers' age of arrival (AOA) affects positively on their L1 writing. In this study, the participants who were Portuguese speakers learning to write in their L2 Japanese had very limited if any support in L1 literacy maintenance. Therefore, those who left their countries of origin at age nine or younger faced greater difficulty in developing writing skills in their L1, compared to their peers who came to Japan as older learners. Because it takes cognitive maturity to develop writing abilities, the age of arrival to an L2 environment (or rather, age of leaving an L1 environment) is a critical factor in investigating the development of L1 literacy and its influence on biliteracy development.

Another important variable that should be taken into account when investigating bilingual writing development is student age. Children in general write more abstract content using more sophisticated language as they grow older. Given that there are varying degrees of interdependency across various aspects of writing skills as reviewed above, it is conceivable that very young children may not benefit so much from linguistic interdependency as their

older peers as it takes time and cognitive maturity to develop such higher order writing skills. Indeed, Dressler and Kamil (2006) attribute the reason for not finding correlation between L1 and L2 vocabulary in the Davis et al. (1999) study to the participants being young and not cognitively mature enough to transfer their lexical knowledge in L1 to L2.

Thus, the studies that have investigated writing abilities in university/-college students and adolescents may not be applied to the writing development of young learners without close examination. Unlike most adults, young learners are yet to develop their writing abilities per se, and the process can be fundamentally different from that of adults acquiring literacy skills on top of their established L1 writing abilities. This difference is similar to the differences between the development of linguistic abilities in sequential bilinguals and that of simultaneous bilinguals or bilingual first language acquisition (De Houwer, 2009). However, this distinction between sequential versus simultaneous development has not been extended to literacy yet (Reyes, 2012, p. 308).

One other factor that appears to be crucial in investigating biliteracy development is the linguistic distance of the two languages in question. While the factors reviewed above differ by individuals, this factor differs by language and is important when synthesising the findings of various biliteracy studies.

On the one hand, linguistic distance between two languages seems to have no influence on higher order skills in writing, in other words, higher order skills appear to be interdependent even with very different languages. On the other hand, the influence of linguistic distance on lexical knowledge varies, with some studies showing interdependency even across typologically different language sets (Francis, 2000; Ikuta, 2002) while others show no correlations even with very similar language sets (Davis et al., 1999). One point to be made is that it may not be the linguistic distance between the two languages per se but rather how similar the writers conceive the two languages, and if they are capable of taking advantage of the cognate relations in the vocabularies. Genesee, Geva, Dressler, and Kamil (2008. p.63) comment

on this point as follows:

> [T] he existence of cognates in two languages may not be a sufficient condition for transfer of cognate knowledge to occur; a belief on the part of the learner that the two languages are similar may be necessary (but probably not sufficient) as well.

Therefore, it would be enlightening to study the writing development of bilinguals where the two languages are typologically distanced and have different writing systems. The present study aims precisely at revealing these relationships.

Research Questions

As has been presented in the above literature review, examinations of various aspects of writing abilities that are language specific and that are interdependent across languages in the case of language sets that use different writing systems are called for. Also, various factors affect the development of writing abilities in the two languages of bilinguals, and investigation of the roles these variables play is necessary. Therefore, this study will investigate the following research questions:

1) What aspects of writing abilities are language specific and what aspects develop interdependently across Japanese and English?
2) What impacts do AGE, AOA, and LOR have on the cross-lingual relationships in the writings of bilingual students?

Method

Participants

The participants were students studying at a Hosyuko (Japanese Saturday school) in a large city in the eastern part of Canada. They attended

Canadian schools instructed either in English or French from Monday to Friday and attended this school on Saturdays. This school was unique in the sense that it aimed to cover the entire curricula set by the Ministry of Education in Japan for educating Japanese students living in Japan, and thus it was not solely focused on teaching Japanese as second or heritage language, but rather focused on teaching academic subjects through Japanese. This site was chosen for the present study because of this feature which was expected to help students develop what Cummins (2001, pp. 65-66) has proposed as academic language proficiency (ALP), and this would provide information about additive biliteracy development.

Table 1 *Participants' Grade, LOR, AOA, and Parents' Mother Tongues*

Grade[1] N(%)		*LOR* N(%)		*AOA* N(%)		*Parents' mother tongues* N(%)	
1	31(12.9)	Less than 2	70(29.2)	C- Born	75(31.3)	Both J	165(68.8)
2	44(18.3)	2 to4	50(20.8)	0-2	10(4.2)	One J	69(28.8)
3	30(12.5)	4-6	24(10.0)	2-4 2-4	22(9.2)	No J	4(1.7)
4	34(14.2)	6-8	26(10.8)	4-6	21(8.8)	Unidentified	2(0.8)
5	23(9.6)	8-10	26(10.8)	6-8	38(15.8)		
6	30(12.5)	More than 10	44(18.3)	8-10	31(12.9)		
7	15(6.3)			10 +	43(17.9)		
8	22(9.2)						
9	11(4.6)						

Note. Less than 2 = Less than 2 years, 2-4 = longer than 2 years and shorter than 4 years, including 2 years
C-Born = Born in Canada
Both J = Both parents native speakers of Japanese, One J = one parent native speaker of Japanese
No J = neither of the parents native speakers of Japanese

Of the 240 students who participated in the study, 106 were male and 134 were female, and they were between 80 months to 187 months old, with the mean being 125.00 months and standard deviation 29.136. Twelve of them attended French Immersion School, while the rest attended English medium schools from Monday to Friday. Participant information is summarised in table 1.

Data Collection

With the approval of the principal, the parents were asked to have their children participate in the study [2]. The students were then asked to write two compositions, one in Japanese and the other in English on the same topic: "Write an essay entitled 'Canada' introducing Canada to someone who has never been here. Try to include as much detail as possible by including your personal experiences and what you have learnt at school." This task was chosen so that students at various ages could find something to write about relevant to their developmental stages. The instruction was printed in the language they were asked to write, on which sheet they were allowed to plan prior to their writing. The teachers also read out the instruction aloud. The grade 1 and 2 students were instructed to use 10 minutes for preparation by drawing. The older students had 5 minutes for preparation either by drawing or writing notes in the language of their choice. There were slight differences in the formats of writing sheets according to their ages such as font sizes, line spacing, and use of *Kanji*. They wrote the Japanese composition on December, 11, 2010, spending 40 minutes [3]. English compositions were written on the same task one week later, with the same amount of time.

The parents were asked to fill in the questionnaires [4] which asked about students' linguistic background, language use and frequencies of reading and writing activities at home. There were 25 questions in total, and they were collected the following Saturday. 87.8% of the questionnaires were collected. In total, 240 participants completed all of the requirements [5] in the study.

Analysis

The collected compositions were analysed for fluency, lexical complexity, grammatical complexity, and accuracy. The 'number of words' was employed as the measure of fluency in English while the 'number of *Bunsetsu*' [6] was chosen as the measure of fluency in Japanese, following Ikuta (2002). For the remaining aspects of writing, the same measures were used for both languages: lexical complexity was calculated as the number of word types divided by the square root of two times the total number of words [7] (Wolfe-Quintero,

Table 2 Descriptors for Organisation

Organisation
4. The organisation of the paragraphs can be logically understood by the effective use of conjunctions etc.
3. Each paragraph has clear topic sentences or the purpose of each paragraph is clear but the paragraphs are not organised in a manner that can be logically understood.
2. The writer has divided his/her essay into paragraphs but the purposes of each paragraph are not clear. Or, each paragraph is not elaborated and consists of one or very few sentences. Also, paragraphs that are conceptually redundant (writing about one concept over several sentences) and paragraphs with irrelevant sentences fall into this category.
1. There are no paragraphs.

Inagaki, and Kim, 1998), and grammatical complexity was calculated as the number of coordinations per clause (sentence width) and the number of subordinations per clause (sentence depth). As for the accuracy rates, the number of grammatical, lexical and conventional errors were counted by two raters and the number of errors per clause was calculated. When counting grammatical, lexical and conventional errors, pragmatic errors at register levels were not included. Errors in spelling, punctuation, and capitalisation in English were taken as conventional errors. Spelling errors in Japanese included erroneous *Kanji*[8] characters and use of incorrect *Kanji* characters as well as errors in *Hiragana* and *Katakana.*

The qualitative aspects of writing were also analysed using rubrics developed for the present study. More specifically, seven aspects of writing abilities were analysed: theme, organisation, cohesion, audience awareness, rhetoric, reflection & originality, and balanced argument. These rubrics were made up of four descriptors each and were designed to be used for both languages across the grades. An example of the descriptors and the points allotted for them for the dimension of "organisation" is shown in table 2. The rest of the rubric is shown in the appendix.

A group of 6, 5 of which are the members of the present study conducted the error analysis and scorings using the aforementioned rubrics. Two of them were native speakers of English, the rest were native speakers of Japanese and one being bilingual in English and Japanese. Their academic expertise covered Japanese language education (as a first language, second

language and heritage language), English as a second language education, and bilingual education. Two raters rated compositions, and for the qualitative aspects of writing, one bilingual rater and another rater being the native speaker of the language rated the compositions in each language. The bilingual rater made sure that both of the ratings were conducted in a similar manner in both of the languages. The inter-rater agreements for error identifications were over 78% in all of the items. As for the qualitative aspects of writing, the rubrics were reviewed and made unambiguous to the extent there were no disagreements between the raters when rating one sample of writing from each grade, the rest of the writings were then rated independently. As a result of these revisions and discussions, the inter-rater statistics (Cohen's κ) were from .478 to .720 for Japanese and from .681 to .936 for English. Although inter-rater reliability was slightly lower in the aspects of "Reflection & Originality" in the Japanese writings, it was still at a moderately acceptable level and no further measure was taken to make the agreement rate higher. The sum of the points given by each rater was used as the scores for each aspect of writing, and thus the scores given for qualitative aspects of writing range from 2 to 8 for the further analysis.

Results

Table 3 Mean Scores and the Standard Deviation for the Japanese Writing

Qualitative aspects of writing (N=240)		*Quantifiable aspects of writing (N=240)*	
Theme	4.64 (1.82)	Fluency	91.74(55.77)
Organisation	4.10 (2.19)	Lexical Complexity	6.29 (1.75)
Cohesion	5.01 (2.35)	Sentence Width	0.35 (0.62)
Audience Awareness	4.97 (1.71)	Sentence Depth	0.34 (0.16)
Rhetoric	4.52 (1.97)	Grammatical Error Rate	0.07 (0.11)
Reflection & Originality	4.05 (1.99)	Lexical Error Rate	0.03 (0.60)
Balanced Argument	3.39 (1.82)	Conventional Error Rate	0.14 (0.17)

Note. Mean (SD).
Scores for qualitative aspects of writing range from 2 to 8.
Fluency is measured as number of Bunsetsu. Lexical complexity is calculated as the number of word types divided by the square root of two times the total number of words. Sentence width and depth, and all the error rates are percentage figures.

Table 4 Mean Scores and the Standard Deviation for the English Writing

Qualitative aspects of writing (N=240)		*Quantifiable aspects of writing (N=240)*	
Theme	4.03 (1.95)	Fluency	181.92(132.45)
Organisation	3.51 (2.15)	Lexical Complexity	4.49 (1.61)
Cohesion	4.49 (2.00)	Sentence Width	0.38 (0.79)
Audience Awareness	4.64 (2.09)	Sentence Depth	0.22 (0.15)
Rhetoric	3.69 (1.89)	Grammatical Error Rate	0.37 (0.32)
Reflection & Originality	3.88 (2.12)	Lexical Error Rate	0.14(0.13)
Balanced Argument	2.88 (1.88)	Conventional Error Rate	0.75 (0.98)

Note. Mean (SD).
Scores for qualitative aspects of writing range from 2 to 8.
Fluency is measured as number of words. Lexical complexity is calculated as the number of word types divided by the square root of two times the total number of words. Sentence width and depth, and all the error rates are percentage figures.

Tables 3 and 4 present the mean scores both in qualitative and quantitative writing aspects in Japanese and English together with the standard deviations. For the aspects of writing that can be directly compared across languages, namely qualitative aspects and lexical complexity, the values were higher in Japanese in most cases. Also, grammatical error rates, though not exactly comparable in a strict sense due to the linguistic differences across languages, were much higher in English. Together, these results indicate that Japanese is the stronger language for most of the students in this study.

In order to see the overall picture of the relationships in writing abilities across English and Japanese, correlational analyses were conducted for each

Table 5 Correlations between the Scores of Writing across Japanese and English (Pearson's *r*)

Qualitative aspects of writing (N=240)		*Quantifiable aspects of writing (N=240)*	
Theme	.459**	Fluency	.569**
Organisation	.520**	Lexical Complexity	.495**
Cohesion	.367**	Sentence Width	-.030
Audience Awareness	.405**	Sentence Depth	.341**
Rhetoric	.466**	Grammatical Error Rate	-.102
Reflection & Originality	.503**	Lexical Error Rate	.057
Balanced Argument	.376**	Conventional Error Rate	.189**

Note. $^{**}p < .01$

Table 6 Partial Correlations between the Writing Scores across Languages Controlling for AGE, LOR, and AOA

Qualitative aspects of writing (N=240)				*Quantifiable aspects of writing (N=240)*			
Controlling for	*AGE*	*LOR*	*AOA*	*Controlling for*	*AGE*	*LOR*	AOA
Theme	.410**	.509**	.482**	Fluency	.398**	.615**	.630**
Organisation	.345**	.556**	.529**	Lex Comp [4]	.340**	.538**	.582**
Cohesion	.232**	.390**	.388**	Sent Width [5]	-.010	-.019	-.011
Audi Aware [1]	.297**	.446**	.442**	Sent Depth [6]	.278**	.344**	.326**
Rhetoric	.331**	.558**	.526**	Gram Error [7]	-.100	-.043	-.041
Ref & Orig [2]	.319**	.549**	.508**	Lex Error [8]	.066	.074	.087
Bal Arg [3]	.307**	.379**	.341**	Conv Error [9]	.104	.197**	.146*

Note.
=Audience Awareness, 2=Reflection and Originality, 3=Balanced Argument, 4=Lexical Complexity, 5=Sentence Width, 6= Sentence Depth, 7=Grammatical Error Rates, 8= Lexical Error Rates, 9=Conventional Error Rates.
* p <.05, ** p <.01

aspect of the writing skills. Moderate correlations were found between English and Japanese in all seven qualitative aspects of writing abilities (table 5). As for the quantifiable aspects of writing; fluency and lexical complexity were found to moderately correlate, while no significant correlations were found between sentence width and error rates in grammar and vocabulary across English and Japanese. Sentence depth and conventional error rate present weak correlations across the languages. Taken together, it seems that good writers in Japanese tend to be good writers in English where qualitative aspects of writing are concerned, and students who write longer texts, or who write with more variety in vocabulary, or with more complex sentences tend to do so in both languages, but this interdependent nature was not found when it came to sentence width and grammatical and lexical error rates.

In order to see the contribution of AGE, LOR, and AOA on the relationships between writing abilities in English and Japanese, a series of partial correlational analyses were conducted controlling for one factor at a time (see table 6).

For all of the qualitative aspects, the correlations were the highest when LOR was controlled. As for sentence width, grammatical error rate and lexical error rate there were no significant correlations with any of the factors

Table 7 Comparison of Writing Correlations across Languages by AGE Groups Controlling for LOR and AOA

	Pearson's r			*Fisher's z*		
	Group1 (N=47)	*Group2 (N=98)*	*Group 3 (N=95)*	$r_2 - r_1$	$r_3 - r_2$	$r_3 - r_1$
Theme	.144	.391**	.540**	1.47	1.31	2.50**
Organisation	.350*	.285**	.431**	-0.4	1.15	0.52
Cohesion	.090	.180	.333**	-0.5	1.12	1.40
Aud Aware [1]	.338*	.306**	.334**	-0.2	0.21	-0.02
Rhetoric	.210	.311**	.523**	0.59	1.77	2.00*
Ref & Orig [2]	.333*	.346**	.391**	0.08	0.36	0.36
Bal Arg [3]	.059	.401**	.300**	2.01*	-0.79	1.37
Fluency	.600**	.495**	.408**	-0.83	-0.75	-1.42
Lex Comp [4]	.459**	.290**	.389**	-1.08	0.77	-0.47
Sent Width [5]	-.064	.193	-.075	1.42	-1.85	-0.06
Sent Depth [6]	.055	.276**	.404**	1.25	0.99	2.04*
Gram Error [7]	-.202	.006	.074	1.16	0.47	1.52
Lex Error [8]	.159	.123	-.071	-.020	-1.33	-1.26
Conv Error [9]	-.135	.465**	.418**	3.51**	-0.40	3.17**

Note. Group 1: age < 96 months, Group 2: 96 months ≦ age < 132 months, Group 3: age ≧ 132months
1=Audience Awareness, 2=Reflection and Originality, 3=Balanced Argument, 4=Lexical Complexity, 5=Sentence Width, 6=Sentence Depth, 7=Grammatical Error Rates, 8= Lexical Error Rates, 9=Conventional Error Rates. * p <.05, ** p <.01

controlled for. In fluency and lexical complexity, correlations were the highest when AOA was controlled while for sentence depth and conventional error rates, correlations were highest when LOR was controlled.

To further investigate the influence of AGE on the relationship between various aspects of writing skills across English and Japanese, the students were divided into three groups based on age; younger than 8, older than 8 and younger than 11, and older than 11, and partial correlations of the scores obtained for each aspects of wiring abilities across Japanese and English were calculated controlling for LOR and AOA. The *r* scores were then compared by means of Fisher's *z* transformation. The results are shown in table 7.

The correlations between the points given for theme, cohesion, rhetoric, reflection & originality, and sentence depth were stronger for higher age groups, indicating stronger interdependency across languages in these

Table 8 Comparison of Writing Correlations across Languages by LOR Groups Controlling for AGE and AOA

	Pearson's r			Fisher's z		
	Group1 (N=70)	Group2 (N=69)	Group3 (N=101)	$r_2 - r_1$	$r_3 - r_2$	$r_3 - r_1$
Theme	.534**	.499**	.460**	-0.28	-0.32	-0.62
Organisation	.551**	.315*	.382**	-1.69	0.48	-1.37
Cohesion	.326**	.282*	.268**	-0.28	-0.1	-0.4
Aud Aware [1]	.366**	.397**	.416**	0.21	0.14	0.37
Rhetoric	.515**	.409**	.378**	-0.78	-0.23	-1.08
Ref & Orig [2]	.524**	.307**	.312**	-1.53	0.03	-1.63
Bal Arg [3]	.316*	.513*	.126	1.38	-2.76**	-1.26
Fluency	.475**	.473**	.560**	-0.01	0.75	0.73
Lex Comp [4]	.390**	.432**	.542**	0.29	0.91	1.23
Sent Width [5]	-.034	.080	.010	0.66	-0.44	0.28
Sent Depth [6]	.392**	.331**	.198*	-0.4	-0.9	-1.35
Gram Error [7]	.006	-.100	.009	-0.61	0.69	0.02
Lex Error [8]	-.120	-.036	.388**	0.49	2.8**	3.34**
Conv Error [9]	.221	-.246*	.233*	-2.74**	0.09	0.08

Note. Group1: LOR < 24 months, Group2: 24 months ≦ LOR < 60 months, Group 3: LOR ≧ 60 months. 1=Audience Awareness, 2=Reflection and Originality, 3=Balanced argument, 4=Lexical Complexity, 5=Sentence Width, 6=Sentence Depth, 7=Grammatical Error Rates, 8=Lexical Error Rates, 9=Conventional Error Rates. * p <.05, ** p <.01

aspects with older students. On the contrary, fluency presented the opposite trend, with higher correlations for younger groups. When the *r* values were compared by means of Fisher's *z* transformation, the differences between the youngest and the oldest groups were at statistically significant levels for theme, rhetoric, sentence depth, and conventional error rates. Pearson's *r* values for groups 1 and 2 were found to be significantly different in balanced argument and conventional error rates.

Table 8 presents comparisons of Pearson's *r* values with varying LOR in an English speaking environment; group 1 being the shortest LOR, less than 2 years, group 3 being more than 5 years and group 2 in between. Though Pearson's *r* values present a subtle decreasing trend with students' LOR in the area of theme, cohesion, rhetoric, and sentence depth, the differences between groups 1 and 3 were not significant. Audience awareness, lexical complexity

Table 9 Comparison of Writing Correlations across Languages by AOA Groups Controlling for AGE and LOR

	Pearson's r			*Fisher's z*		
	Group1 (N=75)	*Group2 (N=122)*	*Group3 (N=43)*	$r_2 - r_1$	$r_3 - r_2$	$r_3 - r_1$
Theme	.499**	.351**	.639**	-1.21	2.13*	1.06
Organisation	.399**	.356**	.487**	-0.34	0.87	0.56
Cohesion	.326**	.068	.564**	-1.81	3.12**	1.52
Aud Aware [1]	.560**	.200*	.465**	-2.88**	1.65	-.0.65
Rhetoric	.396**	.361**	.522**	-0.27	1.10	0.81
Ref & Orig [2]	.358**	.362**	.459**	0.03	0.64	0.62
Bal Arg [3]	.207	.330**	.356*	0.89	0.16	0.82
Fluency	.636**	.387**	.477**	-2.30*	0.61	-1.18
Lex Comp [4]	.530**	.341**	.411**	-1.57	0.45	-0.78
Sent Width [5]	.005	.053	-.141	0.32	-1.07	-0.75
Sent Depth [6]	.076	.341**	.428**	1.87	0.56	1.93*
Gram Error [7]	.114	-.177	.246	-1.96*	2.35*	0.69
Lex Error [8]	.509**	-.029	-.178	-3.95**	-0.83	-3.76**
Conv Error [9]	.223	.009	.330*	-1.46	1.83	0.59

Note. Group 1: AOA=0 month, Group 2: AOA<120 months, Group 3: AOA≧120 months
1=Audience Awareness, 2= Reflection and Originality 3=Balanced Argument, 4=Lexical Complexity, 5=Sentence Width, 6=Sentence Depth, 7=Grammatical Error Rates, 8= Lexical Error Rates, 9=Conventional Error Rates. For the AOA = 0 group, only the AGE was controlled as for these students AGE = LOR
* p <.05, ** p <.01

and lexical error rates present the opposite trend with stronger correlations across languages with longer LORs, only the lexical error rates between groups 2 and 3, and groups 1 and 3 proved to be significant.

The *r* value for "Balanced Argument" of the students who had been in Canada for more than 5 years was significantly lower than that of those who had been in Canada for 2 to 5 years, but there was no significant difference between groups 1 and 3. As for the conventional errors, it was found that the difference in the correlations was statistically significant between groups 1 and 2, with group 2 presenting negative correlation.

Table 9 presents comparisons of Pearson's *r* values with varying AOA; group 1 being those born in Canada, group 3 being those who came to Canada at the age of 10 or older, and group 2 in between. The *r* values were compared

by means of Fisher's *z* transformation. Two patterns found in this table benefit attention. One is that while the correlation of sentence depth or the ratio of subordination across English and Japanese is not observed with group 1, they correlate at a moderate level with group 3, and the comparison of the two correlational statistics was found to be significant. The other is that the correlation of lexical error rates with those who were born in Canada was much higher than the students in the other two groups of which *z* scores proved to be statistically significant.

Discussion

Linguistically Interdependent Aspects and Language-Specific Aspects in Japanese-English Bilingual Writing

As shown above, the results of correlational analyses between the qualitative aspects of writing presented moderate correlations across English and Japanese. Such correlations did not disappear even in partial correlations controlling for the three factors known to affect the bilinguals' language development namely AGE, LOR, and AOA. This result shows that good writers in L1 are good writers in L2 and such interdependency exists with students who have come to an English speaking environment relatively recent or who have been born in Canada and with young and old students alike when qualitative aspects of writing are concerned. This finding that the higher order skills of writing are interrelated across languages is in accordance with previous literature, while confirming that such transfer can occur even across different writing systems.

Fluency and lexical complexity were also shown to correlate across English and Japanese. Lexical knowledge such as fluency as measured in the number of words and *Bunsetsu*, together with lexical complexity may represent the amount of mental concepts, which Cummins (2009) predicts to be one domain of language ability in which cross-linguistic transfer is likely to occur. However, that such transfer can occur even across non-cognate language sets needs to be understood in comparison with somewhat contradictory findings

from research in reading development. In writing modality involving productive activities, it may be that lemmatic transfer, which can occur even across different writing systems, has more effect on the overall outcome, as opposed to lexemic transfer (Jarvis, 2009) which is limited to the language sets that share cognate relationship.

Sentence depth or the proportion of subordinating clauses presented a moderately high correlation. This finding was somewhat unexpected as it does not confirm Ikuta's (2002) observation of biliteracy development in Portuguese students learning to write in Japanese, which found no such correlations. It is speculated that although the languages are typologically very distant, in order to present logical explanations and descriptions the writers needed to produce complex sentences with more embedding and relativisation, the two grammatical features that would be included in subordination. That the participants in our study vary to a greater degree in age compared to Ikuta's study, in which students from 12 to 15 of age participated, may have helped illustrate the effect of writers' cognitive maturity on the development of more complex and academic language.

The aspects of sentence width, grammatical error rates and lexical error rates were shown to be language independent, at least with language sets that are as typologically distanced as Japanese and English, and it is in accordance with Ikuta's study of bilinguals in Portuguese and Japanese.

One striking finding in this study is that the conventional error rates presented a significant correlation across Japanese and English, though at a low degree. This correlation becomes not significant when AGE is controlled for. These correlations indicate that despite the vast differences in the writing systems, there may be some common abilities or attitudes towards spelling accurately across English and Japanese. This point needs a further investigation in more qualitative nature.

Therefore, in response to RQ 1, we can conclude that the writing abilities in English and Japanese indeed appear to have cross-linguistic interdependence to some degree. The qualitative aspects of writing abilities, fluency and lexical complexity as well as grammatical complexity measured in sentence

depth were shown to be interdependent across languages while aspects of sentence width, grammatical accuracy and lexical accuracy are shown to be language specific, at least with language sets as typologically different as English and Japanese.

The Impact of AGE, LOR, and AOA on Biliteracy Development

In response to RQ2, the results of correlational analyses across different age groups and groups of differing LOR and AOA presented some interesting findings.

The impact of AGE. As presented in table 7, the correlations between the points given for theme and rhetoric were found to be stronger at higher age groups. It can be argued that these are the skills learners acquire through schooling and thus can improve as they get older. Another interpretation is that these aspects of writing are dependent on the cognitive maturity of writers and thus improve with age. The same trend was found in the correlations between sentence depths in the two languages. This trend seems to confirm the speculation presented in the above section that sentence depth may be related with the development of academic writing discourse. Writers need more complex sentences to convey more complex ideas, and such is true for both English and Japanese despite the huge difference in grammatical systems, and grammatical complexity develops with writers' cognitive maturity.

Conventional error rates present moderate correlations across English and Japanese in the age groups older than 8 but not with the youngest. This gap between the writers younger than 8 and those older than 8 may at least partially be explained by the relatively infrequent use of *Kanji* in the youngest age group: the mean *Kanji* token used by group 1 was 8.89, by Group 2 was 45.71, and group 3 was 96.75. ANOVA and post-hoc tests (Tukey's HSD) showed these differences to be statistically significant: $F(2,237)=77.09$, $p < .001$.

The impact of LOR. Table 8 presents no meaningful trend across the different LOR groups in qualitative aspects of writing except in the case of "Balanced Argument", which will be looked at later in this section. Overall, we can conclude that these qualitative aspects are not affected by LOR, but rather by

some other factors. Cumming (1989) illustrated how "writing expertise" is a distinct construct from L2 proficiency in the L2 writing of adult writers, and the same seems to apply to younger writers.

An observation of *r* values of "Balanced Argument" reveals an intriguing pattern, which cannot be captured in a linear model. This non-linear development can be explained in the unique characteristic of this rubric. This rubric is different from others in that it is not directly associated with the instruction itself, and thus scoring high in this aspect is not necessary for writing good compositions under this topic. It was included in the analysis in a posterior manner with the aim of capturing the use of contrast that was thought to be characteristic of bilingual students' writing. In some instances, the students "chose" not to write in a contrastive manner, especially in English. Some students with equally high proficiency in both English and Japanese (in terms of all the seven qualitative aspects in the two languages) wrote a comparison of the two countries in Japanese, but did not in English. It can be speculated that these students were sensitive enough to the differing needs of the readers of the compositions in each language: their Japanese composition were highly likely to be read by a Japanese person and thus it made sense to present a comparison between Japan and Canada, but when writing in English this was not so.

As for the conventional errors, it was found that the difference in the correlations was statistically significant between groups 1 and 2, with group 2 presenting a negative correlation. The reason for this pattern may be explained by the difficulty in keeping up with the accurate spelling of *Kanji* characters especially those with longer LORs. The correlation of conventional error rate therefore is negative with group 2 students, but becomes positive again with group 3 students because this group is investing time and effort in keeping up with the learning of *Kanji*, if this were not the case they would have dropped out of the school by this stage. These are only speculations and need to be investigated qualitatively, which is beyond the scope of the present paper.

A more intriguing finding was that there appeared to be a gap between

those who had been in an L2 environment for more than 5 years and those who had not in terms of the correlation across lexical error rates in the two languages. This finding demands attention because what the previous studies have revealed is that the writers will decrease their errors in L2 as LOR increases, but the errors in L1 will increase due to attrition processes (Montrul, 2009). However, the students in this study presented a higher correlation in lexical error rates between the languages as the LOR lengthened, so those who had better lexical knowledge in Japanese tended to have better lexical knowledge in English too and vice versa, and such relationship becomes stronger with the LOR. This means that those who are successful in maintaining/further developing their L1 are better at acquiring their L2, while those who have poor lexical knowledge in one language also tend to have poor lexical knowledge in the other. Such correlations point to a dynamic interaction between the literacy developments in the two languages. One point to be made here is that staying in this school even when their LOR is extended in a way proves that these students have been successful at maintaining their heritage language (HL), since this school is aimed at teaching academic subjects through Japanese, rather than teaching the Japanese language only, and thus is ideal in aiding students' development of academic language proficiency (ALP, Cummins, 2001). The continued support for maintaining/developing literacy skills in their HL is a powerful tool to help students become biliterate.

The impact of AOA. Through comparison of the correlations in many aspects of writing skills of the two languages across three AOA groups, a few points became apparent. Though not statistically significant in all instances, there is a relative tendency to have lower correlations in qualitative aspects of writing with the students who have come to an L2 environment younger than 10, compared to those who were born in Canada or those who have come to Canada at an age older than 10. It is conceivable that those students who came to Canada at older ages developed their L2 literacy based on more solid foundations in L1 literacy, thus the development of L2 literacy and the degree of L1 literacy attainment displays stronger correlations with group 3, who came

to Canada at 10 years old or older. Those who were born in Canada may also have benefitted from high attainment in their HL which is supported by the academic demands of this *Hosyuko*, of which program seems to support the development of ALP in HL. Another finding from this analysis is that the correlation between sentence depths was significantly stronger for those who came to Canada at 10 and older compared to those born in Canada. This means that Canadian born students, who can produce complex sentences with higher subordination in English, do not necessarily do so in Japanese, while the students who came to Canada at an older age can write complex sentences in Japanese and can also transfer that aspect of writing into English. However, the proportion of subordination may have been too coarse of an analytical tool to illustrate the biliteracy development because it has been shown to increase as L2 English develops (Wolfe-Quintero et al., 1998) even though it certainly is an index of development in academic discourse. With a finer analytical tool targeted more specifically to the development of academic discourse, we may have discovered a different picture.

Our final remark is directed to how correlation between lexical error rates in the two languages is outstandingly higher, for the students born in Canada compared to the others. It is speculated that those who are careful about lexical errors in one language carry that attitude into the other language, and such tendency is the strongest with students born in Canada. The proportion of bilingual families also happen to be higher in the students who were born in Canada compared to other groups (66.7% of Canada born students come from bilingual families while 28.8% of overall students are from bilingual families), and this may have had some effect on the result.

Pedagogical Implications and Further Research

As reported in this study, many of the aspects of writing skills do present interdependence across English and Japanese despite the fact that they are typologically and orthographically distant languages. Such interdependence is stronger with higher-order skills and thus quite often there are instances

where the bilingual students' writing presents high levels of sophistication in qualitative aspects, while the language-specific lower order skills such as grammatical/lexical accuracy are yet to develop. Therefore, it is important for teachers to foresee the development in the weaker language based on the development of the stronger language. For that purpose, it would be ideal for teachers of bilingual students to observe their writing abilities in both languages and see what transferable writing abilities the writer already possesses in the L1 or HL, and what writing skills he/she needs support to develop especially in his/her L2.

As has been pointed out in the discussion, a few aspects of writing development need further investigation. Among such aspects are the knowledge of *Kanji* and its relations to English writing, and the development of academic register in writing. Also, further analysis is needed to see the degree of family and school support and its effect on biliteracy development, especially with a closer focus on the students who were born in Canada and yet are successful in maintaining their heritage language at a high level as well as developing their L2 writing. As Reyes (2012, p. 323) points out, "[b]ecause children's language experiences are a by-product of their language choices, patterns, and individual differences, biliteracy development is a dynamic, fluid, and at times seemingly messy process." Therefore a finer, closer investigation with an in-depth description of students' profiles is necessary.

Furthermore, there is a need to investigate biliteracy development in a longitudinal manner; it was shown in the present study how biliteracy development is affected with the writers' cognitive maturity, as well as LOR and AOA. Together with the more detailed analysis mentioned above, longitudinally investigated studies would better inform pedagogical practices for our prospective biliteral learners.

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Notes

1 Grades are in Japanese school system, which sometimes do not match the grades in Canadian school system.

2 It was stated clearly that the purpose of the study was to describe the biliteracy development of school age students, and to identify factors that would promote such development, and the data obtained would not be used for their academic record at the school in any form. It was also made clear that they could choose not to participate or complete the study. Of the 336 students who were willing to participate in the study, 240 wrote both Japanese and English compositions and submitted in the questionnaire and were thus included in this study.

3 The students were instructed to finish their writing within the class period of 40 minutes. Some finished earlier than that, some used up the time. In some cases, the

teachers let them finish the sentence they were writing, but not giving them too much longer than 40 minutes.

4 Parents were given one questionnaire sheet for one student, so in the case of brothers and sisters they were asked to answer the questionnaires separately. It was a necessary procedure as the language of communication may differ from a child to child even within the same household.

5 There were two students who chose to write in French rather than in English and their data were excluded from the investigation for this study.

6 *Bunsetsu* refers to the smallest meaningful unit of a content word with its accompanying functional elements such as verb endings, particles or auxiliary verbs. For example, "Watashi wa gakkou e iki masu." has 6 morphemes but 3 *bunsetsu*.

7 The numbers of tokens and types were counted using online tools: Vocabprofile (Cobb, available at http://www.lextutor.ca/vp/eng/) for English and Cha-Mame (Ver. 1.71. Ogura, available at http://sourceforge.jp/projects/unidic/releases/) for Japanese. In order for these tools to count the number of types and tokens, spelling errors were corrected manually. For the Japanese compositions, the words were converted to *Kanji* as much as possible in order to avoid unnecessary misinterpretation by Cha-Mame.

8 *Kanji* are the logographic characters used in Japanese writing that convey meaning as well as sounds. They originate in Chinese characters and have many strokes, requiring great attention from inexperienced writers. There are an incredible number of homophones in Japanese because of these characters.

Appendix

Writing Rubric

Theme
4. What the writer is going to write about is clearly stated at the beginning, or there is an explicit introduction to the essay such as an overview of Canada. There is solid body of the writing with plenty of details, and the conclusion that shows what Canada is like is clearly stated in the end.
3. The introduction and the conclusion may not be clearly stated, but the essay as a whole functions as an introduction of Canada. If the writer chose some particular aspect of Canada and writes only about that, there has to be an explanation why the writer chose to do so.
2. It is evident that the writer is trying to introduce Canada to the readers, but the writer writes about some specific topics without explaining why he/she chose to write on that particular topic.
1. The writer only writes about his/her personal experiences and as a result the essay does not function as an introduction of Canada.
Cohesion
4. The connections between each sentence are made clear through the use of effective cohesive ties such as conjunctions and pronouns, and the readers can follow the sentences with ease.
3. Although without effective use of cohesive ties, the way sentences are connected are logical and the readers can follow the sentences with ease.
2. It is evident that the writer has paid attention to make it easy for the reader to follow but it is sometimes not easy as the cohesive ties are missing or misleading.
1. It is not easy for the reader to follow each sentence to the next as the cohesive ties are mostly absent and the writer skips one sentence to the next.

Audience Awareness

3. It is clear that the writer is aware that some of the information he/she mentions may not be known to the readers, and thus he/she provides adequate supportive information and/or definitions of the words. The composition as a whole presents enough amount of information.

2. It is somewhat evident that the writer is aware that some of the information he/she mentions may not be known to the readers, and thus he/she sometimes provides explanations but not to the satisfactory extent.

1. The writer does not show concern for the readers' knowledge and present his/her personal experiences with no or very few explanations that are necessary.

Also, if the writer shows affective concerns for the readers who have never been to Canada (e.g. trying to reduce their anxiety) add one point as a bonus

Rhetoric

4. The writer is effective in description and expression through uses of a variety of effective rhetoric, such as use of figures of speech, effective introduction, use of dialogues, and also no uses of inappropriate languages for writing such as "gonna" "kid" "pretty much" (i.e. pragmatic errors) are found.

3. Some attempts to use rhetorical skills are observed but only in some parts of the essay (e.g. there are sporadic uses of figures of speech). Or the essay does not have any specifically unique expressions but descriptions are in detail and satisfactory. There may be some but not many pragmatic errors.

2. The essay does include some descriptions and/or explanations and is clearly more than just a list of facts, but the description would improve with more elaboration. (If the writer mentions many topics but does not elaborate on each topic, that writing would fall into this category even if the amount of overall information is great.). There may be some but not many pragmatic errors.

1. The writer presents a list of facts only and has no elaboration in description and /or explanation. Or there are too many pragmatic errors to the extent it disturbs reader's understanding.

Reflection & Originality

3. The writer's view is persuasively expressed or the reasoning for the writer's judgement is abstract enough to be generalised.

2. The writer basically states factual things only, although there are some personal remarks. Or the writer presents simple reasoning for his/her judgements. The samples that state the writer's opinion in the end after factual description fall into this category.

1. The writer presents factual things only and does not state unique perspectives or judgement.

Also, if the writer's point of view or the way he/she expressed it is unique, add one point as a bonus

Balanced Argument
4. The characteristics of Canada are argued in comparison with familiar countries to the writers such as Japan and the U.S.A. and the writer presents concrete examples, facts and his/her personal experiences. Or, the argument has both good and bad aspects of Canada and the writer's opinion whether Canada is a good country or not is clearly stated in a persuasive manner.
3. The writer points out some aspects of Canada in comparison with countries that he/she is familiar with and they are elaborated to some extent. Or, it is evident that the writer tries to have a balanced argument about whether Canada is a good country or not, and it is elaborated to some extent.
2. The writer points out some aspects of Canada in comparison with countries that he/she is familiar with but does not elaborate on it. Or, although it is evident that the writer tries to have a balanced argument about whether Canada is a good country or not, it is not elaborated.
1. The writer presents no perspectives about good or bad aspects of Canada. No comparison with other countries such as Japan or the U.S.A. is presented.