Orthographical Errors in Beginning and Intermediate Learners of L2 Japanese from Two L1s

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Abstract

Although the development of orthographic knowledge has been well-documented in L1 English children, relatively little work has examined orthographic development in L2 learners, particularly of non-English languages. This paper presents preliminary results from a longitudinal and cross-sectional study of orthographic knowledge development in 81 adult L2 Japanese learners in their first and second years of language study. Results show changing patterns of frequent error types across development, as well as different patterns of errors between learners with L1 English vs. L1 Chinese. These error types are compared across L1 groups and across time. Pedagogical implications are also discussed.

1. Introduction

Research interest in second language (L2) Japanese is growing, both inside and outside of Japan (Mori & Mori, 2011). A sizeable body of research literature examines L2 Japanese, including the development of grammatical abilities (e.g., Ishida, 2004; Li & Shirai, 2015; Ozeki, 2008; Ozeki & Shirai, 2007; White, Hirakawa, & Kawasaki, 1996), affective factors such as motivation and attitudes (e.g., Dewey, 2004; Grainger, 2005; Mori, 1999; Shimizu & Green, 2002), and vocabulary learning and word recognition (e.g., Chikamatsu, 1996, 2006; Kondo-Brown, 2006; Matsumoto, 2013; Matsunaga, 2003; Tamaoka, Kiyama, & Chu, 2012; Toyoda & McNamara, 2011). The greatest emphasis in this work has been on spoken language development, with relatively little focus on written language development. Of those studies that have examined written L2 Japanese, the most common emphasis has been on students' and instructors' attitudes toward, and strategies for, learning and teaching kanji (e.g., Dewey, 2004; Manalo, Mizutani, & Trafford, 2004; Mori, 1998; Mori & Shimizu, 2007).

To the best of our knowledge, only one group of researchers has systematically examined the development of written kanji and the types of errors that are commonly made by Japanese learners (although Aihara, 1980, discussed written kanji errors, few details were given about the distributions of error types). Hatta and colleagues (Hatta, Kawakami, & Hatasa, 1997; Hatta, Kawakami, & Tamaoka, 1998; Hatta, Kawakami, & Tamaoka, 2002) describe the most common error types made in written kanji by Grade 7 Japanese schoolchildren and university-level Japanese students (native speakers), as well as foreign learners of L2 Japanese. Despite the common (mis)conception that phonological information is irrelevant for kanji processing (e.g., Matsunaga, 1996; Mori, 1998, 2012), Hatta et al. found that native Japanese-speaking university students tended to make more phonologically-related errors than orthographically- or semantically-related errors. This often resulted in an incorrect kanji character that had the same pronunciation as the intended character. In contrast, native

Japanese-speaking middle school students tended to make more orthographically-related errors. The errors made by L2 learners most often involved the substitution of kanji characters with non-real kanji approximations, with mistakes such as misusing, misplacing, adding, or deleting a stroke or segment. The results from these studies reveal that the most common types of kanji errors may vary across groups with different language backgrounds, which has implications for tailoring language instruction.

Moving beyond Japanese, literacy research in general has revealed the influence of first language (L1) background on L2 literacy skills. More specifically, text-processing procedures develop differently across varying writing systems (e.g., Frost, 2012; Koda, 2004; McBride-Chang, et al., 2005; Ziegler & Goswami, 2005) and these L1-specific processes often transfer to and influence the L2 (e.g., Koda & Zehler, 2008; Wang et al., 2003). Although much of this research has focused on literacy in English, a handful of studies have established a similar pattern for L2 Japanese, particularly by comparing L1 English and L1 Chinese learners. Tamaoka (1997) examined L2 Japanese kana and kanji processing and found that L1 English and L1 Chinese speakers were equally successful at processing kana, but that L1 Chinese speakers were faster and more accurate at processing kanji. He also found that the visual complexity of kanji characters had a greater impact on processing for L1 English than L1 Chinese speakers. Chikamatsu (1996) also compared L1 English and L1 Chinese learners of L2 Japanese and found that L1 English-speaking learners relied more on phonological information for visual word recognition, while L1 Chinese-speaking learners relied more on visual-orthographic information. This phonological strategy in L1 English speakers was persistent, diminishing only slightly across two years of university-level study (Chikamatsu, 2006). Finally, Matsumoto (2013) examined performance on an L2 Japanese lexical decision task and again found that L1 Chinese speakers were more accurate than L1 English speakers. She also found that L1 English speakers particularly struggled with pseudohomograph items (created by replacing one kanji character with another, visually similar kanji), compared to pseudohomophones (visually different but with the same pronunciation). This pattern again highlights the difficulty that L1 English speakers have with the visual complexity of kanji characters.

2. The Current Study

Though there is growing research interest in L2 Japanese, little focus has been given to *written* L2 Japanese or its development. This is despite the acknowledged difficulty of acquiring written Japanese (e.g., Hatasa, 2002; Mori, 2014) and the critical role that literacy plays in full linguistic competence (e.g., Kern, 2000). Therefore, the first goal of this study was to provide an in-depth examination of the written orthographic errors produced by L2 Japanese learners. At the

same time, literacy research has demonstrated the influence that the characteristics of a learner's L1 writing system has on their subsequent L2 literacy development, including in Japanese (e.g., Chikamatsu, 1996, 2006; Hatta et al., 1997, 1998, 2002; Matsumoto, 2013; Tamaoka, 1997). Thus, the second goal of this study was to directly compare the orthographic errors made by L2 Japanese learners with L1 English versus L1 Chinese. Further, given the lack of research on developmental change in L2 Japanese writing (Matsumoto, 2013; see also Chikamatsu, 2006, for an exception), errors were collected from students across the first two years of university-level L2 Japanese study. This was done to examine whether, or how, error patterns change across development.

3. Method

Data collection was both longitudinal (across an academic year) and cross-sectional (from two cohorts). Data were collected from students in their first or second year of Japanese study at a large urban university in the United States. This language program used the Jorden Method (Jorden & Noda, 1987), which emphasizes spoken language development with minimal early emphasis on written language.

3.1. Participants

Data were collected from a total of 81 participants: 61 first-year students (elementary level) and 20 second-year students (intermediate level). In both years there was some attrition across semesters. Details of the number of participants and their language backgrounds are given in Table 1.

3.2. Materials

The data consisted of written assessments completed by the students as part of their normal course curriculum. In the first semester, elementary students completed one homework assignment and one in-class quiz that used katakana only; both were completed in week 8 (of a 16-week semester). In the second semester, elementary students completed three in-class quizzes; the first two required students to write the correct kanji from a given hiragana word, and the last two included free-writing sections in which any combination of katakana, hiragana, and kanji could be used. All targeted kanji came from words that students had been taught in class. These quizzes were completed in weeks 5, 9, and 14.

All written assessments collected from the intermediate students were in-class kanji quizzes, similar to the first and second quizzes collected from the elementary students. In the first semester these quizzes were completed in weeks 5, 8, 12, and 15. In the second semester they were completed in weeks 6, 9, 12, and 15.

Table 1. *Participant characteristics*

	First-Year Students (Elementary)	Second-Year Students (Intermediate)
Semester 1	61 total	20 total
	38 L1 English	16 L1 English
	23 L1 Chinese	4 L1 Chinese
Semester 2	44 total	13 total
	30 L1 English	11 L1 English
	14 L1 Chinese	2 L1 Chinese

3.3. Coding Scheme

The coding scheme was adapted from Hatta and colleagues (1997, 1998, 2002). Their original coding scheme included categories for phonologically-, orthographically-, and semantically-related errors, as well as combinations of these three types. This scheme was expanded in the current study to include a number of additional categories that reflected both structural characteristics of the written forms (e.g., incorrect radicals, missing or extra kanji characters) and phonologically- or language-related errors (e.g., incorrect insertion or deletion of a long vowel, incorrect particles). Similar, but separate, codes were developed for the kana and kanji errors that participants produced. The coding schemes for each type of written form are in Table 2 and Table 3.

Table 2. *Kana error coding scheme*

Code	Description	Example
F	Form	ン→ソ
O	Onset	カ→キ
V	Vowel	カ→サ
I	Insertion of long V	ハム→ハーム
D	Deletion of long V	オーストラリア→オストラリア
M	Missing diacritic	ガ→カ
N	Nasal error	ハム→ハン
T	L1 transfer resulting in insertion of kana	レスリング→ワレスリング
K	Missing kana	エジプト→エプト
WP	Wrong case particle	日曜日に*どうですか
P	Missing case particle	土曜日（の）晩
E	Other	If none apply

Table 3. *Kanji error coding scheme*

Code	Description	Example
P	Phonological	社会→社回
O	Orthographic	季節→委節
S	Semantic	潜伏→潜存
KK	Kana instead of kanji	旅館→りょ館
X	Extra (unnecessary) kanji	午後*土曜日
MK	Missing kanji	旅館→（　）館
RE	Radical	頼→願
C	Chinese transfer	毎→毎
CON	Conjugation error	知っている→知る
OT	Other	If none apply

4. Results

4.1. Perfect Scores

The first analysis examined the proportion of each L1 group that obtained a perfect score on each written assessment. These figures are in Table 4 and Table 5. On each assessment at the elementary level there were more L1 Chinese students who received perfect scores (8.70% to 71.43% of students; on average 49.85%) than L1 English students (5.26% to 40.00% of students; on average 24.25%). The same pattern was found for the intermediate level: for each in-class quiz, a greater proportion of the L1 Chinese students received perfect scores (50% to 100% of students; on average 71.88%) than the L1 English students (6.25% to 45.45% of students; on average 16.41%).

Table 4. *Percent of elementary students with a perfect score on each assessment*

		L1 Chinese	L1 English
Semester 1	Homework 1	47.83	18.42
	Quiz 1	8.70	5.26
Semester 2	Quiz 2	71.43	40.00
	Quiz 3	71.43	33.33

Table 5. *Percent of intermediate students with a perfect score on each assessment*

		L1 Chinese	L1 English
Semester 1	Quiz 1	50.00	37.50
	Quiz 2	75.00	18.75
	Quiz 3	75.00	6.25
	Quiz 4	75.00	6.25
Semester 2	Quiz 5	100.00	45.45
	Quiz 6	100.00	27.27
	Quiz 7	50.00	9.09
	Quiz 8	50.00	18.18

4.2. Elementary Kana Errors

The second analysis examined the average number of errors of each type, per student (by L1), on each written assessment. Written error rates in kana were examined first and are in Table 6. These errors only occurred in the elementary-level students because all assessments collected from the intermediate-level students consisted of kanji-only quizzes.

Errors with the onset, as well as the general form, were much more common for the L1 English speakers than the L1 Chinese speakers, though this difference declined noticeably in the second semester of study. L1 English speakers also tended to have somewhat more difficulty producing the correct kana for a nasal segment, for example writing ハ<u>ム</u>バーガー（ム）instead of ハン<u>バーガー</u>（ン）. Compared to the L1 English speakers, the L1 Chinese speakers tended to have more difficulty with particles, either providing the wrong particle or missing a particle that should have been present (e.g., 土曜日<u>が</u>あるんです instead of 土曜日<u>に</u>あるんです, or 土曜日__晩 instead of 土曜日<u>の</u>晩). L1 Chinese speakers also had relatively more errors that were categorized as 'Other', such as アースト (and similar variants) instead of オーストラリア, あとまた話っます instead of またあとで話しましょう, and a combination of several errors, such as writing とてすが instead of どうですか (two missing diacritics, an insertion of a diacritic, and a missing kana).

Table 6. *Average kana errors per elementary student*

	HW 1		Quiz 1		Quiz 2		Quiz 3	
Code	Ch	En	Ch	En	Ch	En	Ch	En
F	.04	1.61	.17	.95	.21	.03	.07	.07
O	.26	.55	.26	.37	.21	.07	.29	.27
V	0	.05	0	.10	.21	.03	.07	.07
I	.17	.89	.61	.45	0	0	0	0
D	.17	.74	.83	.74	.07	0	0	0
M	.09	.16	.04	0	.14	.03	.36	.10
N	.09	.26	.22	.32	0	0	0	0
T	.13	.08	.04	0	0	0	0	0
K	.09	.13	0	0	1.00	.33	0	.17
WP	--	--	--	--	.64	.07	1.14	1.00
P	--	--	--	--	.71	.37	.21	0
E	.04	.18	.39	.26	2.07	.07	.93	.33

Both L1 groups had difficulties with vowel length, inserting or deleting a long vowel that should, or should not, have been present. This was particularly common on the constrained assessments (kanji quizzes), which required students to produce specific lexical items, compared to the free-writing assessments. In contrast, learners from both groups had relatively few errors that involved providing the incorrect vowel quality. They also had few errors that involved missing kana (e.g., 行きたんです instead of 行きたいんです); this latter type of error was also somewhat more common on the free writing than the constrained assessments.

4.3. Elementary Kanji Errors

The kanji error rates produced by the elementary level learners are in Table 7. These errors were collected from the kanji quizzes and free-writing assessments from the second semester of first-year study.

Table 7. *Average kanji errors per elementary student*

	Quiz 1		Quiz 2		Quiz 2 Free Writing		Quiz 3 Free Writing	
Code	Ch	En	Ch	En	Ch	En	Ch	En
P	0	.03	.07	.10	.14	.17	0	.07
O	0	.03	0	.23	0	.10	0	.03
S	0	0	.07	0	.21	.20	0	.13
KK	--	--	--	--	.21	.57	.57	.77
X	--	--	--	--	.29	.03	0	.03
MK	--	--	--	--	.43	.37	.07	.70
RE	0	.07	0	.13	.07	.03	0	.27
C	.07	.03	.07	.07	.21	0	.36	.03
CON	--	--	--	--	.07	0	.50	.30
OT	0	.57	0	.10	.07	.07	.07	.30

Considering first the three categories developed by Hatta et al. (1997, 1998, 2002), the L1 English speakers consistently produced more phonologically- and orthographically-related errors than the L1 Chinese speakers, while the L1 Chinese speakers had somewhat more semantically-related errors. This differs from previous findings, although those studies focused on comparisons of L1 English speakers and L1 Japanese (native) speakers, not L1 Chinese speakers. Specifically, Hatta and colleagues found that native Japanese speakers made more phonologically-related errors while L1 English speakers made more orthographically-related errors; in contrast, in the current study L1 English speakers made more orthographically-related errors *and* more phonologically-related errors.

The L1 English speakers were also more likely to replace target kanji with kana substitutions and make errors in radical usage than the L1 Chinese speakers. The L1 English speakers also made more errors classified as 'Other', such as writing 後 instead of 晩 (an incorrect meaning), or writing non-real kanji characters. On the other hand, the L1 Chinese speakers made a number of errors that could be traced to their L1 knowledge and also made somewhat more errors with verb conjugations than the L1 English speakers (e.g., 知ります instead of 知っています). There was some evidence of transfer for L1 Chinese in some of the errors made by these speakers, in particular using simplified characters instead of Japanese kanji (e.g., 书 instead of 本, and 馆 instead of 館). Both groups produced errors that involved writing unnecessary, extra kanji (e.g., 午後＊土曜日 when the prompt states "this Saturday") or leaving out kanji that should have been present (e.g., missing 晩 though required in the prompt to write 土曜日の晩).

4.4. Intermediate Kanji Errors

4.4.1. Semester 1

The kanji error rates produced by the intermediate level learners during Semester 1 are in Table 8. The first pattern that can be noticed is the substantial reduction in the average number of errors per student compared to the rates at the elementary level. This provides direct evidence for improvement in written accuracy, at least at the level of orthographic form, from the first to the second year of study.

Table 8. *Average kanji errors per intermediate student in Semester 1*

Code	Quiz 1		Quiz 2		Quiz 3		Quiz 4	
	Ch	En	Ch	En	Ch	En	Ch	En
P	0	0	0	.06	0	.06	.25	.13
O	.50	0	0	0	0	0	0	0
S	0	.13	0	0	0	0	0	.25
RE	0	.13	0	0	0	.19	0	.06
C	0	0	.25	0	0	0	0	0
OT	0	.31	0	.44	0	.13	0	.50

Considering again the three categories of errors identified by Hatta et al. (1997, 1998, 2002), in these data the L1 English speakers produced somewhat more persistent phonologically- and semantically-related errors (though the L1 Chinese speakers also had some phonologically-related errors). In contrast, the only evidence of orthographically-related errors came from L1 Chinese learners on the first assessment alone. These results thus provide further evidence of the importance of phonological information for kanji processing (e.g., Matsunaga, 1996; Mori, 1998, 2012), even among L2 learners of Japanese.

Because of the nature of the data collected from the intermediate level learners (in-class kanji quizzes only), it was not possible to examine errors related to providing extra kanji, missing kanji, or inappropriately substituting kanji with kana. However, there was continued evidence of difficulty with radicals for the L1 English speakers, similar to the pattern found in the second semester at the elementary level. The L1 English speakers again provided all instances of errors categorized as 'Other', such as 国食 instead of 和食, 全内 instead of 客様, 何 instead of 色, and a number of other examples of non-real kanji characters. The L1 Chinese speakers showed evidence of L1 influence in errors only on the second quiz, thus demonstrating a much lower rate of errors that could be directly attributed to L1 influence.

4.4.2. Semester 2

The kanji error rates produced by the intermediate level learners during Semester 2 are in Table 9. At this time point the overall error rates reduced even further, especially for the L1 Chinese speakers, who produced no errors from the major category types (phonologically-, orthographically-, or semantically-related, radicals, influence from L1 Chinese, or 'Other'). Further, there were no errors from either group of learners that could be classified as orthographically- or semantically-related, based on Hatta et al.'s (1997, 1998, 2002) criteria. However, the L1 English speakers continued to show phonologically-related errors in most assessments and also continued to produce errors related to radical usage and errors classified as 'Other', such as 署りる instead of 借りる, 図買 instead of 映画, and non-real kanji characters.

Table 9. *Average kanji errors per intermediate student in Semester 2*

Code	Quiz 5		Quiz 6		Quiz 7		Quiz 8	
	Ch	En	Ch	En	Ch	En	Ch	En
P	0	.27	0	.09	0	0	0	.55
O	0	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0	0
RE	0	0	0	0	0	.18	0	.36
C	0	0	0	0	0	0	0	0
OT	0	.09	0	.27	0	.36	0	.36

5. Qualitative Error Analyses

Some of the more interesting errors that were made by L1 English speakers reflected L1 to L2 transfer, such as ワレスリング (instead of レスリング, thus including the 'w' from 'wrestling'), スカルト (instead of スカート, thus including the 'r' from 'skirt'), and コクテル (instead of カクテル; thus replacing カ with コ for 'cocktail'). These errors represent orthographic transfer from the L1 (the 'w' from 'wrestling', 'r' from 'skirt', and the use of an 'o' sound based on the spelling of 'cocktail') and demonstrate how students apply their L1 orthographic knowledge to the L2 by selecting a kana form that corresponds to the L1 written form, rather than the phonological form. The error with 'cocktail' in particular represents both an onset error and L1 orthographic transfer: learners seem to be taking the English spelling of 'cocktail' and directly transferring 'co' to write コ instead of カ in Japanese. In total 10 out of 38 L1 English speakers made this specific spelling error.

During the analysis, it also became apparent that some of the errors made by both groups were not strictly orthographic but also related to functional aspects of the language. One of the more frequent error types made by elementary level learners in free production involved verb conjugations. For example, two common errors involved dropping the small っ from 知って います (resulting in 知ています) and also き from 行きたい (resulting in 行たい). There are two possible explanations for these errors: either the L2 learners made a pure spelling error and forgot to write the kana as part of the okurigana, or the learners had not fully acquired the correct verb conjugation (i.e., did not understand that the small っ or き were required in the conjugation), thus leading to the spelling error. The former may truly only be a spelling issue, but the latter has implications for language development more broadly.

Functional language errors were also evident in other cases. For example, one of the quiz prompts that students had to translate was: "I don't know [any] good hotel but I know a nice Japanese style inn in front of the station…" Here, an example of a correct answer would be "いいホテルは知りませんが、駅前にあるいい旅館は知っています" (with the imperfective form of 知る in the underlined portion, 知っている). However, many students wrote 知ります instead, i.e., they used the infinitive form 知る (知り), which is a direct translation of 'know' instead of conjugating it to the correct imperfective form.

There are several possible explanations for this. One is that students interpreted the prompt literally and wrote 'know a nice Japanese style inn' as いい旅館を知ります (with the incorrect verb form). However, given that the curriculum places heavy emphasis on oral production and learning phrases in chunks (a feature of the Jorden method), it is unlikely that students were unfamiliar with the proper phrase for this type of statement (i.e., いい旅館を知っています). A more

plausible explanation is based on the one-to-one principle deployed by language learners, which states, "learners generally prefer to assign one meaning to one form" (Sugaya & Shirai, 2007, p. 28; see also Andersen 1984). The imperfective *te-i* (*ru*) form in Japanese has multiple meanings ascribed to it, including the progressive, resultative, perfect, and habitual (see Sugaya and Shirai, 2007, for the imperfective form; Li and Shirai, 2015, for the non-past/present, past, and imperfective forms; and Shirai & Kurono, 1998, for alternative resultative state forms). These multiple meanings make *te-i* (*ru*) one of the more difficult grammatical forms to acquire in Japanese. However, research has shown that, in general, progressive *te-i* (*ru*) is easier for L2 learners to acquire and use than the resultative (and the other two imperfective meanings), one reason being that there are no other competing grammatical forms that denote the progressive in Japanese (Sugaya & Shirai, 2007). If we presume that L2 learners map the easier function to the form (following the one-to-one principle), they would thus associate the progressive, rather than the resultative, to the imperfective form. Assuming that the participants were exposed to multiple *te-i* (*ru*) forms early (L2 Japanese language curriculums generally introduce the progressive *te-i* (*ru*) before other meanings), the current results provide additional evidence that L2 learners struggle with the correct usage of the resultative meaning of *te-i* (*ru*), and that there is an intersection between the orthographic, spelling, and functional development of the language.

Another example of the overlap between spelling and functional language errors was the mixture of plain and polite forms, using *desu* and *masu* (different politeness markers) in the same clause. Although students made functional or usage errors with these forms, in general they were spelled 'correctly' and thus were not coded as errors. Despite this, combining plain and polite forms is considered functionally incorrect. Again, because the focus of the curriculum was on learning chunks or phrases, it is unclear why some students combined both plain and polite forms, which they would not have experienced in class. The combination of *desu* and *masu* suffixes were most prevalent in the following sentence: いいホテルは知りませんですけど (instead of いいホテルは知りませんけど・が; lit. "I don't know [any] good hotel but…"). This is grammatically incorrect, and in the error analysis was coded as extra kana; however, this again raises the question of what constitutes purely orthographic errors, and how to delineate between orthographic and functional errors. These issues are currently under further consideration with a larger sample of elementary and intermediate level L2 Japanese students from the same institution.

6. Summary and Conclusions

This study provides one of the first in-depth examinations of orthographic errors produced by adult L2 Japanese learners. Although research interest in L2 Japanese has been growing, most of this work focuses on oral rather than written language development. Thus, little is known about whether or how written errors change across time with further language development. In addition, although previous research has suggested that L1 background influences learners' L2 Japanese text processing (e.g., Chikamatsu, 1996, 2006; Matsumoto, 2013; Tamaoka, 1997), less work has examined the influence of L1 on L2 Japanese writing. To address these issues, data were collected longitudinally across an academic year from elementary and intermediate university students learning L2 Japanese. Written errors in kana and kanji forms were coded into a number of categories, which were expanded from those developed by Hatta et al. (1997, 1998, 2002), who

examined kanji errors in L1 and L2 Japanese speakers. Errors were also coded separately for L1 English and L1 Chinese learners, to allow for a direct comparison of the most common error types in learners with different L1 writing systems.

The results showed two major trends. First, the frequency of errors decreased substantially across time, both when comparing the intermediate learners to the elementary learners and when comparing the assessments collected at the end of Semester 2 to the beginning of Semester 1. It should be noted that although errors did decrease noticeably over time, this pattern was not strictly linear, with some types of errors decreasing and then increasing again in their prevalence. In general, though, despite the fact that the Jorden method does not emphasize early literacy development, there were still large improvements in orthographic accuracy by learners in this program across the first two years of language study.

Second, there were both similarities and differences in the types of errors most commonly made by learners with L1 English versus L1 Chinese. Overall, the L1 Chinese speakers were generally more accurate, which is consistent with previous research suggesting that L1 Chinese speakers have strong visual-orthographic skills (e.g., Akamatsu, 1999, 2003; McBride-Chang et al., 2005; Wang & Geva, 2003) and may have an advantage for processing L2 Japanese kanji. At the same time, this L1 Chinese knowledge also led to specific types of errors made by these learners, such as (incorrectly) transferring simplified characters from Chinese into Japanese kanji. In contrast, the L1 English learners produced relatively more errors overall, in particular form errors, phonologically-related errors, and errors with radicals. In addition, their kanji errors frequently resulted in the production of non-kanji characters. This latter finding is consistent with the results from Hatta et al. (1997, 1998, 2002), who also found that L2 Japanese learners often produced non-existent kanji forms. The L1 English speakers also showed evidence of transfer from their L1, such as producing kana forms to match the spelling of the L1 English word (rather than its pronunciation).

A number of errors were also observed which constituted an overlap between orthographic and functional linguistic errors. These included inaccurate particle use, incorrect verb conjugations, and incorrect aspectual form use. In some of these cases, the orthographic form was incorrect; however, this was not always the case. When errors did overlap between orthography and linguistic function, they went beyond a simple spelling mistake to also encompass a problem with usage. This was especially evident with the production of the imperfective form, where students consistently made errors in producing the correctly conjugated form (e.g., the infinitive instead of the imperfective).

Although the objective of the current analysis was to examine orthographic and spelling development, it is evident that aspectual forms of Japanese also impacted L2 writing development. Building on previous research demonstrating that certain tense-aspect forms are easier to acquire than others (e.g., Li & Shirai, 2015), we propose that future research should further examine the correspondence between orthographic and spelling development and functional language use, as this has the potential to lead to both a broader and a more nuanced picture of L2 writing development. Overall, the current study demonstrates both that orthographic and spelling errors are influenced by L1 background, and that future research should consider linguistic features of the target language that may contribute to L2 orthographic development.

7. Acknowledgments

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