



Direction of translation and textual cohesion: A study of two Spanish translations of *The Analects* using Coh-Metrix-Esp¹

Zhao LiuEast China Normal University (China) ✉ **Ce Sun**Tianjin Foreign Studies University ✉ <https://dx.doi.org/10.5209/clac.81171>

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EN Abstract: This study set out to investigate the effect of direction on textual cohesion. It compares two Spanish translations of 论语 (*The Analects*) from Chinese, one by a non-native translator and the other by a native translator. Both translations are examined at the lexical, syntactic, and textual levels using Coh-Metrix-Esp to determine the overall textual cohesion. The results indicate that a native speaker's translation is more coherent than that of a non-native speaker, presenting more paragraph breaks, shorter words, a low type-token Ratio, less syntactic complexity, and a higher readability score. Detailed data analysis also reveals, however, that the non-native translator makes greater use of connectors to explain the cultural and historical context. In conclusion, we contend that non-native translators can achieve native-like proficiency in their L2 and render successful translations. Hence, even though native translators' rendition is more coherent and easier to read, there seems to be no apparent advantage of native translators over non-native translators.

Keywords: Direction; Cohesion; Coh-Metrix-Esp; *The Analects*.

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1. Introduction

Directionality has been a central concern in translation studies for the past two decades. Scholars look into the possible effect of direction in translation and interpretation, as well as its implication for translation teaching (Elamin, 2016; Hagemann, 2019). Studies have also been on a broad set of languages (e.g., English, German, French, and Slovene, among others). However, research into the language pair Mandarin Chinese-Spanish is scarce.

The Analects, one of the most important classics of Confucianism, collects and records Confucius' words, conversations, and life tales (Ames, 2003). As an embodiment of the historical, ethical, and moral values of traditional Chinese culture, it has been translated into numerous languages and has a lengthy history of translation, including Spanish. To date, we've collected approximately forty Spanish versions of *The Analects* (complete or partial translations). However, whereas numerous studies have been conducted on the English translation of *The Analects* (Tao, 2018; Q. Li, 2014; Pang, 2015; He, 2017; Xu, 2014), the Spanish translation has received scant attention. Zhu (2004, p. 332) notes that translation research involving Chinese (as the source or target language) has been conducted extensively in China but published primarily in Chinese. More research on the English translation of *The Analects* can be accessed from CNKI, an information publishing institution based in China, and researchers are primarily concerned with the translation of key terms (Zheng, 2013). To the best of our knowledge, only a few studies have adopted a corpus-driven approach to compare different Spanish translations quantitatively.

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The goal of the present study is to investigate the effect of translation directionality on textual cohesion. For this purpose, we employ Coh-Metrix-Esp developed by Quispesaravia et al. (2016) to compare two Spanish translations of *The Analects*.

2. Background

This section addresses the concept of direction and translation competence and describes the relevant studies. We also review studies in which Coh-Metrix has been used to analyze data.

2.1. Translation direction

Directionality has been an object of study since more than two decades ago. It is defined as “whether translators are working from a foreign language into their mother tongue or vice versa” (Beeby Lonsdale, 2009, p. 84). Several terminologies have been proposed to express the taxonomy referring to translation into a foreign language, such as *theme*, *service translation*, *reverse*, *inverse translation*, and *retour*, among others (Pavlovic, 2007, p. 3).

A considerable amount of literature seems to advocate that translation should be into one’s mother language. For instance, the oft-quoted 1976 Nairobi Declaration states that “a translator should, as far as possible, translate into his mother tongue or into a language of which he or she has a mastery equal to that of his or her mother tongue” (cited in Shuttleworth & Cowie, 2014, p. 42). This view is supported by Nida (1964, p. 149) when he refers to the relationship of the translator to source and receptor languages: “[i]deally, a translator should be completely bilingual in source and receptor languages, and should be translating into his mother tongue. But this ideal is rarely realized.” Similarly, Newmark mentions that translating into a language of habitual use is the only way to translate “naturally, accurately and with maximum effectiveness” (Newmark, 1988, p. 3). The advantages of native translators over non-native translators seem to be also supported by Sofer (2013, p. 18): “[g]enerally speaking, one translates from another language into one’s own native language”, who reasons that native speakers are more familiar with their own language, and this familiarity cannot be obtained solely by years of study and experience.

Translating into a foreign language is frequently regarded as inferior or even forbidden (Stewart, 1999). Despite the common belief that translations should be performed in the native language, translation from the native language into a foreign language is unavoidable (Campbell, 2013, p. 11; Beeby Lonsdale, 2009, p. 84). Newmark himself states that in the real world, inverse translations are more common (Newmark, 1988, p. 3). Moreover, Shuttleworth and Cowie (2014, p. 42) find that even inverse interpreting is preferred in regions such as Central and Eastern Europe. In actual practice, the directionality is also conditioned by a set of factors, including language pairs and text types. Moreover, as pointed out by Beeby Lonsdale (2009, p. 86), it is also affected by other political or social factors such as globalization, market conditions, and language status.

As a matter of fact, translation into a foreign language has a long and rich history. Not only in the western world but also China, inverse translation has been conducted for centuries (Wang, 2011). During the second and third centuries of BD, monks from Central Asia carried out the earliest translation of Buddhist sutras from Sanskrit into Chinese. In addition, missionaries who arrived in China during the sixteenth and seventeenth centuries translated a considerable amount of scientific works into Chinese (Hung & Pollard, 2009).

In the past years, numerous studies have attempted to determine whether translation direction has an effect and, if so, what that effect entails. Some research provides empirical data on easiness or better performance in direct translation. For example, Marmaridou (1996) observed that translating into one’s mother tongue often yields better texts than translating out of it. PACTE group (2011) posited that directionality plays a role in determining the difficulty of translation problems. Participants perceive the inverse translation as more challenging than the direct translation. J. Li and De la Fuente (2018) researched translating Chinese idioms into Spanish. Overall, there was no difference in source text (ST) comprehension, but native translators outperformed non-native translators in terms of expression in the target text (TT). Similarly, Duběda (2018) also found better performance in translating texts into L1.

Nonetheless, some studies suggest an opposite outcome for language direction. In the research utilizing word translation tasks, Chmiel (2016) found an L2-L1 direction advantage. Other studies also suggest that translators perceive more difficulty when translating into an L2 (Mraček, 2018) or present a decrease in quality while interpreting into the L1 (Van Dijk et al., 2011).

Moreover, research has revealed no substantial effect of direction. Pokorn (2005) analyzed the English translation of Ivan Cankar’s prose by translators with various linguistic backgrounds. She discovered that the translator’s strategies are not totally correlated with their linguistic knowledge. Thus, native language speakers do not necessarily render better TT. Pavlovic’s (2007) study is more toward the cognitive approach during translation, and, in her research, both native and non-native translators experience comparable lexical challenges.

It is not whether the direct or inverse translation is advantageous, but instead that they are distinct. For instance, Kring (1986) found that basic strategies translating into L1 and L2 are identical, but the order of application varies (cited in Kiraly, 1995, p. 166). Similarly, Malkiel (2004) found that translation into the mother language might not be easier than translation into a foreign language but more intensive and less time-consuming. In a similar vein, according to Jakobsen (2003, p. 72), translating into a non-native language requires more time. His study analyzed the effect of think-aloud and language direction on translation speed, revision, and segmentation. However, only the influence of language direction on translation speed was found.

Moreover, the direction also can interact with other factors to exert a joint influence on translation. For instance, Nicodemus and Emmorey (2015) found an effect of expertise on translation. Novice translators of

American Sign Language (ASL) performed better when interpreting into their L1, whereas expert interpreters performed similarly in both directions.

In general, as observed from previous studies, direct or inverse translations appear to be related to the translator. In terms of why translating into L1 yields better results, Marmaridou (1996) attributes it to the activation of the conceptual structure of translators' L1 from a cognitive point of view. It seems to be more akin to the general linguistic processing mechanisms. Nevertheless, the seemingly apparent advantage of native speakers seems to be biased sometimes. Additionally, scholars highlight the benefits of translating into a foreign language. Non-native translators may be more attuned to some source-text features; hence, they seem to possess an advantage in source-text comprehension (Mraček, 2018; Stewart, 1999, p. 51). For example, Rogers (2005) found that L2 translators could produce a coherent TT; they are more meticulous in background information research. Further, even native speakers make mistakes in their translations, i.e., they are less efficient in proofreading, which frequently remains unnoticeable (Rogers, 2005; Stewart, 2000, p. 210).

It seems that data reported in the literature are unable to determine whether direction has an effect on translation and how that effect manifests itself. It also appears that translation quality has not only to do with the translator's nativeness but rather a function of translators' individual qualities and strategies (Chan, 2007, p. 287). In the next section, we will revise some relevant studies on translation competence.

2.2. Translation competence

The concept of translation competence and what elements constitute it has been a long-standing debate in history. According to the *Dictionary of Translation Studies*, Toury (1995/2012) proposed a definition for translation competence as follows:

[T]he total system of ST-TT relationships which could theoretically be manifested in a translation but which will to a large extent remain unrealized. In other words, translational competence is the linguistic (and also for example stylistic and literary) resource which a translator will draw on while searching for translational solutions, rather than those solutions which are commonly turned to (norms) or those which may be found in a particular translation (performance) (cited in Shuttleworth & Cowie, 2014, p. 26).

Translation competence is inextricably tied to one's linguistic skills, and this linguistic competence in both target and source languages seems fundamental for translation. However, competence extends beyond linguistic ability, as learning to translate is distinct from learning a foreign language. Bell (1991, p. 42) puts that communicative competence in both cultures is also essential to "create, comprehend and use context-free texts as the means of participation in context-sensitive (situated) discourse". As prerequisites for professional translators, Sofer (2013, pp. 17-19) lists ten crucial factors: (1) thorough knowledge of two languages; (2) "at-homeness" in both cultures; (3) awareness of language change (nuances and neologisms); (4) translate into their mother language; (5) knowledge of various fields; (6) facility for speaking or writing; (7) good speed of translation; (8) research skills; (9) dominance of media and technology and keep up with its development; and (10) knowing his or her language specialty's potential in a particular geographic area.

Thus, translation competence encompasses all key dimensions of language acquisition, namely (socio)linguistic, pragmatic, and intellectual competence (Stewart, 1999, p. 52). Moreover, it takes into account other specific sub-competence such as content knowledge, information communication, technology dominance, monitoring capacity, and research ability (Neubert & Shreve, 1992, p. 38; Pospescu, 2013, p. 1078). Furthermore, a speaker's ability to translate is developing. Translators into the second language exhibit range of capabilities in developing language at the textual level. Instead of describing translation deficiency in the TT, we should consider the competence of the translators (Campbell, 2013, p. 70), which allows them to accomplish equivalence on multiple levels, including lexical, semantic, textual, pragmatic, and cultural levels (Pospescu, 2013, p. 1077).

2.3. Coh-Metrix and Coh-Metrix-Esp

The tool used to assess the effect of directionality on translation in this study is Coh-Metrix-Esp. Coh-Metrix is an automatic computational tool developed by researchers at the University of Memphis to assess the cohesion of a text employing a wide range of parameters (McNamara et al., 2014). It provides indices at different linguistic levels, such as lexical, syntactic, and textual, to shed light on a text's cohesion and readability.

Coh-Metrix has been used extensively to analyze text complexity, discourse cohesion, and reading difficulty within the field of linguistics (Best et al., 2005). Elfenbein (2011) holds that Coh-Metrix is useful for revealing similarities and differences between texts rapidly and conveniently. Solnyshkina et al. (2014) compared reading comprehension texts used in two different English tests with parameters given by Coh-Metrix. McCarthy et al. (2007) studied discourse variation in Japanese scientists' written texts (journal abstract) from that of American or British scientists.

Given its effectiveness in gauging textual features, studies also apply Coh-Metrix to compare translations (Chon & Shin, 2020; Kim & Lim, 2019; H. Li et al., 2014; Liu, 2021). H. Li, Graesser, and Cai (2014) compared Google translation against human translation using Coh-Metrix (English and Chinese). Likewise, Kim and Lim (2019) conducted a comparative analysis of the English writing of Korean students with Google Translation. Chon and Shin (2020) used the information provided by Coh-Metrix to evaluate the effect of machine translation on Korean students' English writing products. Liu (2021) analyzed college students' English translation exercises in terms of cohesion with Coh-Metrix.

Later, Quispesaravia et al. (2016) developed Coh-Metrix-Esp based on Coh-Metrix 3.0, allowing us to probe this tool in Spanish texts. First, we will briefly describe the indices offered by Coh-Metrix-Esp.

- *Descriptive data*. Some basic counting information encompasses the total number of paragraphs, the total number of sentences, the total number of words, and the mean number of syllables in words.
- *Word information*. The measure is indicative of the richness of the vocabulary knowledge in a text. It counts the word category per 1000 words, such as nouns, verbs, adjectives, pronouns, and adverbs.
- *Lexical diversity*. It is informed by indices such as the Type-token ratio for all words or only for content words.
- *Referential cohesion or coreference*. Under this measure, we can find indices indicating the overlap between sentences. Depending on the type of overlap, it can be categorized as noun overlap, argument overlap, or stem overlap. Furthermore, referential cohesion can be local, between adjacent sentences, or global, between all sentences in a given text.
- *Connectives*. The incidence score for five major classes of connectors is provided for this measure, and it is calculated by counting the occurrence of connectives for every 1000 words. These connectives are causal, logical, adversative, temporal, and additive. Moreover, the incidence score is also given for all connectives.
- *Syntactic pattern density*. It provides information on the incidence of a particular syntactic pattern, such as verb phrases and negation.
- *Syntactic complexity*. For this measure, the average number of modifiers per noun phrase is calculated, indicating the extent to which a sentence is syntactically complex.
- *Readability*. In Coh-Metrix-Esp, a score for readability is calculated using Flesch-Fernandez Huertas and the calculation formula.

The came into being of Coh-Metrix-Esp provides us with a set of 45 objective metrics to measure the readability of a text. Coh-Metrix can be used to compare textual cohesion, and its indexes provide reliable data for further statistical comparison. However, few studies have attempted to compare Spanish translations of Chinese literature using textual analysis tools. To the best of our knowledge, only J. Li and De la Fuente (2018) have undertaken quantitative research of this nature, and they only examined one parameter, namely the type-token ratio. In view of this, we set out to compare two Spanish translations of *The Analects*, one by a Chinese scholar and the other by a Spanish scholar, using Coh-Metrix-Esp. This study is guided by the following two research questions: 1) Does translation direction have an effect on the two translations? And 2) Does the native translator render a more coherent translation than the non-native translator?

3. Methodology

In this section, we describe the methodological issues concerned in the present study. We first explain the selection of translation and preparation for analysis. The section concludes by presenting the statistical tests used for analysis.

3.1. Corpus construction

In this study, Coh-Metrix-Esp is implemented on a java system, generating results for 45 indices for each text we introduce. In accordance with Quispesaravia et al. (2016), this study will focus on the 25 that are deemed the most relevant.

In terms of studies on translation directionality, Malkiel (2004, p. 209) states that there are two general ways of conducting research: between groups comparison, in which L1 and L2 speakers translate the same text into their respective L1 and L2; and within-group comparison, in which the same group of speakers translates two matched texts into and from their L1. In this study, the comparison will be carried out on the former type mentioned by Malkiel.

Our corpus comprises two complete Spanish translations of *The Analects* by Chang (2020) and Suárez (1997), respectively. These translations were selected based on the following criteria: First of all, both were rendered directly from Chinese. We did not include indirect translations via English or French because it is plausible that mediate languages also have affected the translation. Secondly, the year of translation and publication was comparable. In this instance, the same time span will reduce the effect of certain historical factors. Thirdly, since Chang is a Chinese translator and Suárez is a Spanish translator, comparing their translations may shed light on the possible difference in translation direction.

Suárez is a Spaniard and French translator who has extensively translated from Chinese and French into Spanish. According to the database Chinese Literary Translation in Spain (Rovira-Esteva et al., 2019), she has translated about 20 Chinese books into Spanish. In 1997, Suárez's version of *The Analects* was released by the Kairós publishing company. Chang is a renowned Chinese translator who published a Spanish translation sponsored by the Chinese government (2009) in 2009. This version is bilingual; it contains both Chinese and Spanish. As one of the translations related to the Library of Chinese Classics, the goal was to introduce Chinese literary classics to a global audience and enable readers without Chinese cultural or linguistic backgrounds to understand Chinese culture better. The Herder publishing company re-edited and released it in Barcelona, Spain, in 2020. The original Chinese text was removed from the latter version, and the layout differs slightly. In this study, we use the 2020's version because it is published in Spain, and some modifications have been made to the latest version.

3.2. Procedure

The translations were typed onto a computer and revised by a second researcher. Later, they were cleaned for other features (footnotes, publication information, etc.). Following McNamara et al. (2014, p. 121), each translation was further divided into 20 books; thus, 40 files were included in the analysis. The corpus was

processed with Coh-Metrix-Esp (self-written Java code executed from the Terminal in OS X), and JSON-formatted results were then collected and reorganized in Excel sheets. Statistical analysis and data visualization were conducted using R Studio (R Core Team, 2019).

3.3. Data analysis

Regarding analysis, we begin with a general descriptive analysis of the entire translation (without paratexts). Independent *t*-tests (Student's *t*-test for data with equal variance and Welch's *t*-test for data with unequal variance) or non-parametric Wilcoxon tests were administered. For the sake of clarity in terms of results presentation, we used the following abbreviations: t_{Student} refers to the Student's *t*-test, t_{Welch} refers to the Welch's *t*-test, U for the Wilcoxon test. $CI_{95\%}$ refers to the 95 percent confidence interval. Mean (M), Median (Mdn), Standard deviation (SD), degree of freedom (df), *t*-value, *p*-value, and Cohen's *d*-value for effect size are reported.

4. Results

In this section, we first present the general descriptive data for all indices analyzed. The descriptive statistics results are reported in section 4.1, while the remaining results are presented in their respective sections.

4.1. General descriptive data

Table 1 presents the indices' mean value and standard deviation for both translations. Following this, we further divided the measures into four groups: at the lexical level, both *Word Information* and *Lexical Diversity* indicate the richness of the vocabulary; at the syntactical level, *Syntactic Complexity* and *Syntactic Pattern Density* are indicators of how complex the syntax is; at the textual level, *Referential Cohesion* and *Connectives* tell us how smoothly a text connects its parts; and, overall, *Readability* stands out as an indicator of how easy it is to understand a text.

Table 1. Mean value and Standards deviation of all parameters analyzed in two translations using Coh-Metrix-Esp

Group	Measure	Index	Chang		Suárez	
			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Descriptives		Total n. of paragraphs	25.6	9.77	61.6	21.04
		Total n. of sentences	79.8	23.4	80.8	24.5
		Total n. of words	1255.7	345.6	1063.7	287.6
		Mean n. of syllables	2.08	0.05	2.01	0.05
Lexical	Word Information	Noun	229.7	16.2	241.5	18.7
		Verb	222.4	13.6	224.1	16.1
		Adjective	53.52	9.31	45.69	9.68
		Pronoun	16.77	7.28	14.98	5.83
		Adverb	49.8	7.85	53.4	8.99
	Lexical Diversity	Type-token ratio (content)	0.44	0.04	0.44	0.04
Type-token ratio (all)		0.35	0.04	0.33	0.04	
Syntactic	Syntactic Complexity	Mean modifiers per NP	0.67	0.06	0.6	0.07
	Syntactic Pattern Density	Verb phrase	79.2	23.4	79.4	24.1
		Negation	27.9	7.9	27.8	6.9
Textual	Referential Cohesion	Noun overlap	0.28	0.1	0.27	0.09
		Argument overlap	0.42	0.09	0.36	0.11
		Stem overlap	0.3	0.1	0.29	0.1
	Connectives	All	52.2	11.1	41.7	12.0
		Causal	2.15	1.13	0.4	0.6
		Logical	25.6	7.5	25.8	7.4
		Adversative	10.5	3.8	5.9	3.8
		Temporal	10.3	5.2	6.3	6.2
Additive	27.6	6.2	26.7	7.2		
Readability		Flesch-Fernandez	76.8	3.4	80.4	2.8

As Table 1 shows, Suárez's translation has more paragraphs and sentences. On the other hand, Chang's translation contains more words and longer words (as measured by the *Mean number of syllables per word*). The statistical analysis revealed a significant difference for the *Total number of paragraphs* (DESPC) and for the *Mean number of syllable per words* (DESWLsy): DESPC, Chang ($M = 25.6$, $SD = 9.77$), Suárez ($M = 61.6$, $SD = 21.04$), $t_{\text{Welch}}(26.8) = -6.93$, $p = 1.96e-07$, $d = -2.19$, $CI_{95\%} [-2.95, -1.29]$; DESWLsy, Chang ($M = 2.08$, $SD = 0.05$), Suárez ($M = 2.01$, $SD = 0.05$), $t_{\text{Student}}(38) = 4.19$, $p = 0.000158$, $d = 1.33$, $CI_{95\%} [0.62, 1.97]$.

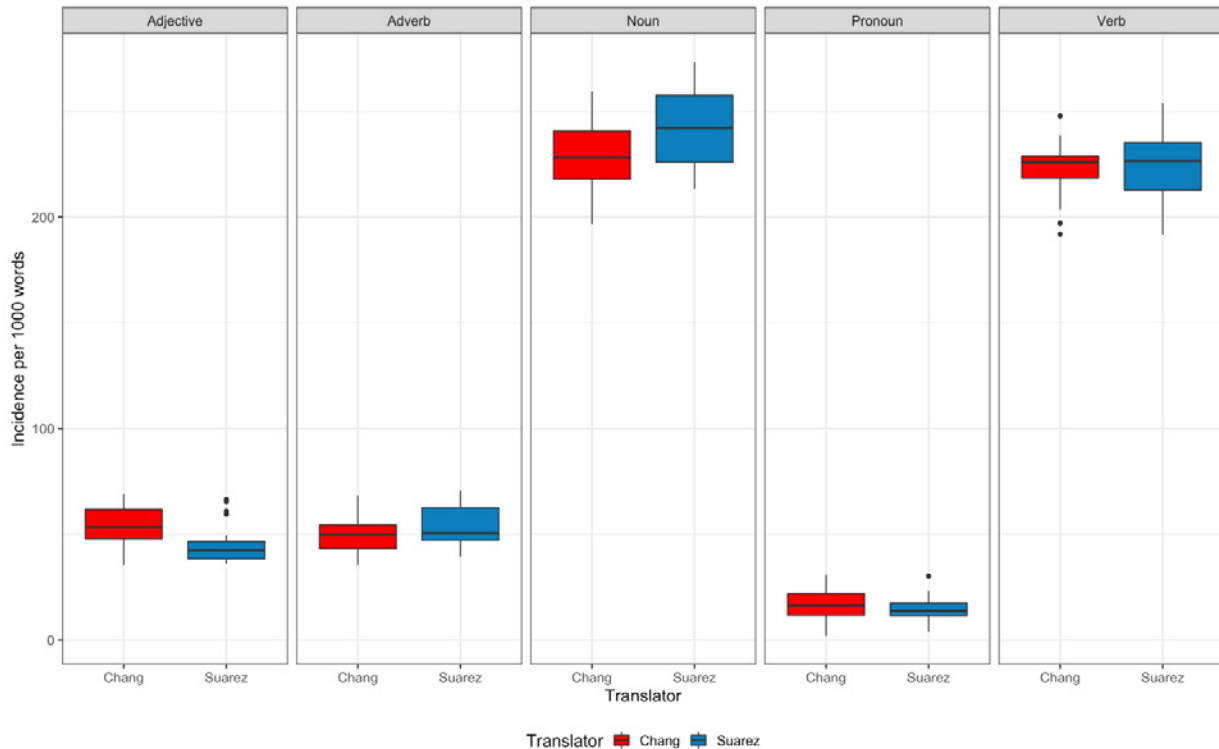
The differences observed for the *Total number of sentences* (DESSC) and the *Total number of words* (DESWC) were not statistically significant: DESSC, Chang ($M = 79.8$, $SD = 23.4$), Suárez ($M = 80.8$, $SD = 24.5$), $t_{\text{Student}}(38) = -.125$, $p = .901$, $d = -0.0397$, $CI_{95\%} [-0.65, 0.57]$; DESWC, Chang ($M = 1255.7$, $SD = 345.6$), Suárez ($M = 1063.7$, $SD = 287.6$), $t_{\text{Student}}(38) = 1.91$, $p = .064$, $d = 0.604$, $CI_{95\%} [-0.03, 1.21]$.

According to Table 1, Suárez's translation greatly exceeds Chang's total number of paragraphs (61.6 vs. 25.6). We compared both translations to determine the cause of this difference and found that Suárez always uses paragraph breaks to indicate a change in speaker. Chang, however, does not insert a paragraph break into the midst of a conversation inside the same saying. Using paragraph breaks and indentation can make the dialogue easier for the reader and may help create a dialogic and conversational style.

4.2. At the lexical level

At the lexical level, we look at indices related to *Word Information* and *Lexical Density*. Figure 1 depicts the overall number of occurrences per 1000 words for each category across both translations. The frequency of nouns and verbs is greater than that of other categories (adjectives, adverbs, and pronouns). In addition, Chang uses more adjectives and pronouns, whereas Suárez uses more nouns and adverbs.

Figure 1. Incidence of words per category (Adjective, Adverb, Noun, Pronoun, and Verb) for both translations



The statistical analysis only revealed a significant difference for *Noun* and *Adjective*. Suárez ($M = 241.5$, $SD = 18.7$) uses significantly more nouns than Chang ($M = 229.7$, $SD = 16.2$) in the translation: $t_{\text{Student}}(38) = -2.15$, $p = 0.0381$, $d = -0.68$, $CI_{95\%} [-1.29, -0.04]$. Mann-Whitney test showed that Chang ($Mdn = 53.39$) uses more adjectives than Suárez ($Mdn = 42.6$) does: $U = 294$, $p = 0.0103$, $r = 0.402$, $CI_{95\%} [0.15, 0.7]$, $n_{\text{obs}} = 40$. No significant difference was found for adverb, pronoun or verb: *Adverb*, Chang ($M = 49.8$, $SD = 7.85$), Suárez ($M = 53.4$, $SD = 8.99$), $t_{\text{Student}}(38) = -1.33$, $p = .19$, $d = -0.422$, $CI_{95\%} [-1.03, 0.2]$; *Pronoun*, Chang ($M = 16.77$, $SD = 7.28$), Suárez ($M = 14.98$, $SD = 5.83$), $t_{\text{Student}}(38) = 0.858$, $p = 0.396$, $d = 0.271$, $CI_{95\%} [-0.35, 0.87]$; *Verb*, Chang ($M = 222.4$, $SD = 13.6$), Suárez ($M = 224.1$, $SD = 16.1$), $t_{\text{Student}}(38) = -0.36$, $p = 0.721$, $d = -0.114$, $CI_{95\%} [-0.72, 0.5]$.

Another parameter is TTR (type-token Ratio), which is used extensively to measure vocabulary diversity and how rich a text is. Generally speaking, the greater the TTR, the more diverse the vocabulary. Recall from Table 1 that Chang's translation has a higher TTR for all words (0.35 vs. 0.33) but not for content words alone (0.44 vs. 0.44). This result runs in line with what we have obtained from Word information, i.e., the content word includes nouns, verbs, adjectives, and adverbs. According to the previous analysis, Chang employs more adjectives and pronouns than Suárez. Thus, it is likely that Chang repeats more function words such as

prepositions and articles, which leads to a significantly higher number of TTR for all words (LDTTRa) but not for the content words (LDTTRc): Chang ($M = 0.35$, $SD = 0.04$), Suárez ($M = 0.33$, $SD = 0.04$), $t_{\text{Student}}(38) = 2.14$, $p = .0384$, $d = 0.678$, $CI_{95\%} [0.04, 1.29]$; Chang ($M = 0.44$, $SD = 0.04$), Suárez ($M = 0.44$, $SD = 0.04$), $t_{\text{Student}}(38) = -0.175$, $p = .862$, $d = -0.0552$, $CI_{95\%} [-0.66, 0.55]$.

4.3. At the syntactical level

Both *Syntactic Complexity* and *Syntactic Pattern Density* are indicators of how complex the syntax of a text is. Coh-Metrix-Esp provides information concerning the incidence of the *Verb phrase* (DRVP), *Negation* (DRNEG), and the *Mean number of modifiers per noun phrase* (SYNNP). Given that easy syntax is commonly associated with short sentences, few words before main clauses, and few words per noun phrase (McNamara, 2014, p. 70), we would expect that the lower these indicators, the easier the syntax. As Table 2 shows, both translations have comparable values for *Verb phrase* and *Negation*, and statistical analysis revealed no difference. In contrast, the SYNNP turns out to be significantly higher for Chang than for Suárez. This is also expected, given that modifiers in Coh-Metrix-Esp refer to the adjectives used within a noun phrase (Quispesaravia et al., 2016, p. 4695). If we recall, Chang uses more adjectives in his translation, and hence, it is reasonable that his translation has a greater *Mean number of modifiers per noun phrase*.

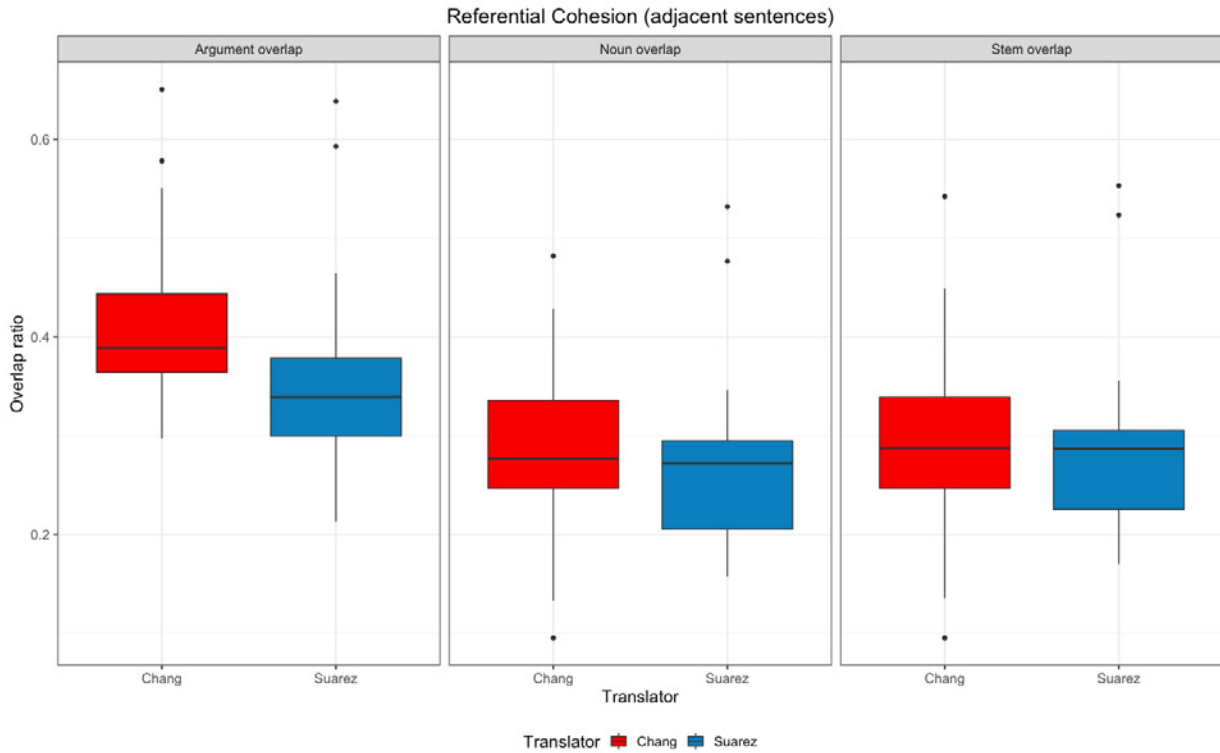
Table 2. Syntactic indices' difference in two translations (Student's t -test). Mean (M), Standard deviation (SD), degree of freedom (df), t -value, p -value, and Cohen's d -value for effect size are reported.

	Chang (M/SD)	Suárez (M/SD)	df	t	p	95% CI	Eff. size (d)
SYNNP	0.67 (0.06)	0.6 (0.07)	38	3.69	.0007	0.48, 1.8	1.17
DRVP	79.2 (23.4)	79.4 (24.1)	38	-0.03	.98	-0.62, 0.6	-0.01
DRNEG	27.9 (7.9)	27.8 (6.9)	38	0.06	.95	-0.59, 0.63	0.02

4.4. At the textual level

At the textual level, we look at *Referential Cohesion* and *Connectives*. *Referential Cohesion* measures how words or concepts are represented or repeated in different sentences. High cohesion can aid readers in establishing connections between sentences and, thus, making the text more comprehensible and easier to read (McNamara et al., 2014, p. 63). As for *Referential Cohesion*, Figure 2 illustrates the values of these three indices for both translations. In general, Chang's translation has greater *Noun overlap*, *Argument overlap*, and *Stem overlap*. However, the statistical results were only significant for argument overlap: Chang ($Mdn = 0.39$), Suárez ($Mdn = 0.34$), $U = 5.69$, $p = .00948$, $r = .406$, $CI_{95\%} [0.15, 0.71]$, $n_{\text{obs}} = 40$. The statistical results for *Noun overlap* and *Stem overlap* were not significant: *Noun overlap*, Chang ($Mdn = 0.28$), Suárez ($Mdn = 0.27$), $U = 5.42$, $p = .507$, $r = .11$, $CI_{95\%} [-0.23, 0.45]$, $n_{\text{obs}} = 40$; *Stem overlap*, Chang ($Mdn = 0.29$), Suárez ($Mdn = 0.29$), $U = 5.41$, $p = .525$, $r = .12$, $CI_{95\%} [-0.24, 0.45]$, $n_{\text{obs}} = 40$. We may wonder why there are differences for argument overlap but not for noun ones. McNamara et al. (2014, p. 63) state that argument overlap is less strict than the noun one. Thus, even though Chang's translation outperforms Suárez's translation slightly in terms of noun overlap, the difference for argument overlap is much higher and turns out to be statistically significant.

Figure 2. Overlap ratio for Argument overlap, Noun overlap, and Stem overlap in two translations



Connectives link different parts of sentences to make the text or ideas flow more smoothly. Figure 3 presents connective incidence obtained for two translations. Overall, Chang uses more connectives than Suárez.

Figure 3. Incidences of all categories of Connectives (All, Additive, Logic, Temporal, Adversative, and Causal) in two translations

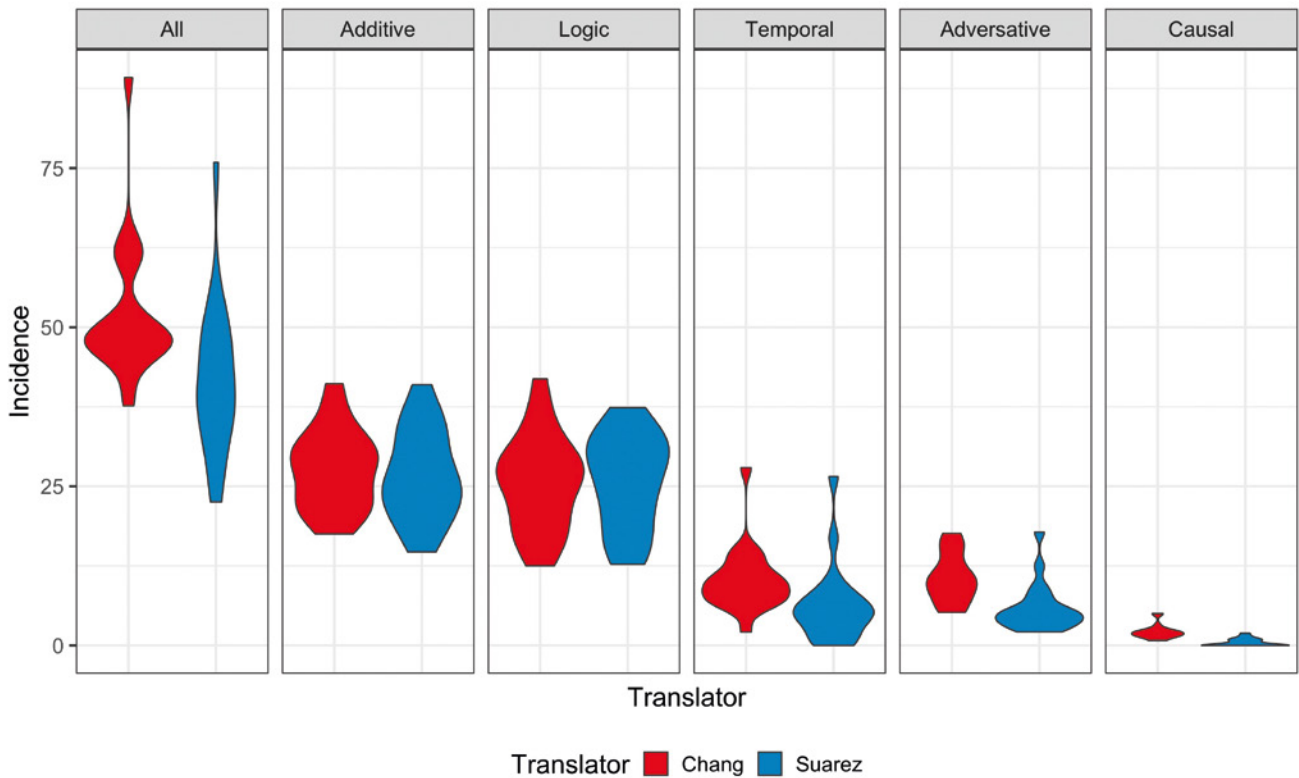


Table 3 presents the statistical results for all connectives. As we can see, there is a significant difference for all, causal, adversative, and temporal connectives. A thorough reading of both translations reveals that Chang employs connectors to reveal the ST's inner logic, whereas Suárez respects the ST's structure and uses fewer connectors.

Table 3. Statistical results for connectives incidence difference in two translations. Mean (*M*), Standard deviation (*SD*), Degree of freedom (*df*), *t*-value, 95% confidential interval (95% CI), and Cohen's *d*-value for effect size are reported for the *t*-test. Median (*Mdn*), *u* value, *p*-value, 95% confidential interval (95% CI), and *r* for effect size are calculated for Mann-Whitney tests. No degree of freedom is used in the Mann-Whitney test.

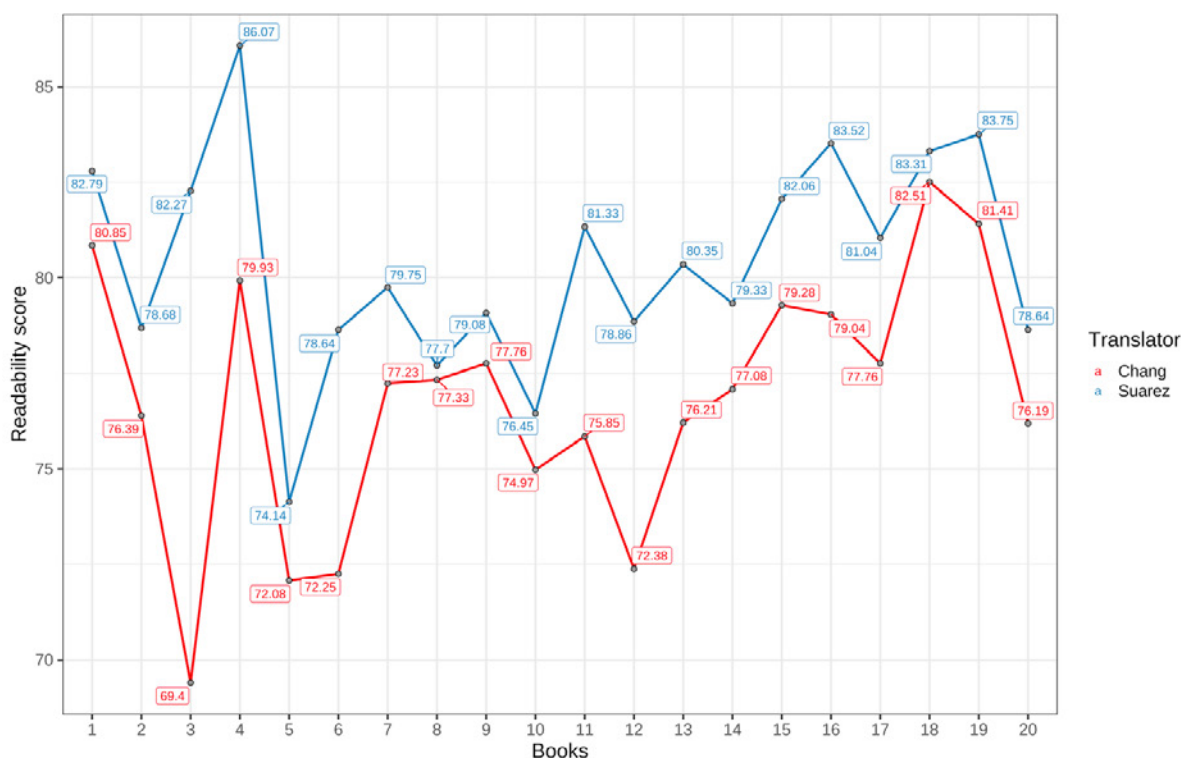
	Test	Chang (<i>M</i> or <i>Mdn</i>)	Suárez (<i>M</i> or <i>Mdn</i>)	<i>df</i>	<i>u</i> or <i>t</i>	<i>p</i>	95% CI	Eff. size (<i>d</i> or <i>r</i>)
All	Mann-Whitney	48.23	40.17	-	5.73	.002	0.24, 0.75	.46
Causal	Welch	2.15 (1.13)	0.4 (0.6)	28.98	6.12	<.01	1.1, 2.65	1.92
Logical	Student	25.6 (7.5)	25.8 (7.4)	38	-0.08	.94	-0.63, 0.58	-0.02
Adversative	Mann-Whitney	10.04	4.77	-	334	.000155	0.42, 0.83	.573
Temporal	Mann-Whitney	9.59	4.87	-	312	.00256	0.26, 0.76	.479
Additive	Student	27.6 (6.2)	26.7 (7.2)	38	0.45	.656	-0.47, 0.75	.142

4.5. Readability

The readability score is calculated using Flesch-Fernandez (Quispesaravia et al., 2016, p. 4695), and according to this, Suárez's translation is easier to read. The Student's *t*-test shows that Suárez scores higher in readability than Chang: Chang (*M* = 76.8, *SD* = 3.4), Suárez (*M* = 80.4, *SD* = 2.8), $t_{Student}(38) = -3.65, p = 0.000778, d = -1.16, CI_{95\%} [-1.78, -0.47]$.

Since *The Analects* has twenty books or chapters, we also intend to find out if a trend can be observed in readability along with books. Figure 4 depicts Readability scores on the y-axis and books on the x-axis.

Figure 4. Readability score for 20 books in two translations



As Figure 4 shows, the difference between the two translations for Book 3 seems to be noticeable (Chang 69.4 and Suárez 82.3). It is intriguing to consider why translators have rendered this passage so differently, and a close inspection revealed that Chang's translation in this book is considerably longer than Suárez's. He provides further information than he might have inferred from the ST, verbalizing them explicitly in the target text to ensure understanding. Suárez generally conforms to the structure of the ST and produces a literal translation.

5. Overall discussion and conclusion

This study examines the effect of translation direction on textual cohesion. Recall that Chang is working in L2 and Suárez is working in L1. In Table 4, we present our key findings and their impact on which translation is more cohesive or simpler to read.

Table 4. Summary of main findings

Group	Feature	Chang	Suárez	Easier
General	Paragraph change	-	+	Suárez
	Mean n. of syllables per Word	+	-	Suárez
Lexical	TTR (all)	+	-	Suárez
	Noun	-	+	—
	Adjectives	+	-	—
Textual	Overlap	+	-	Chang
	Connectives	+	-	Chang
Syntactical	Syntactic complexity	+	-	Suárez
Readability	Readability score	-	+	Suárez

As Table 4 shows, Suárez's translation is easier to read than Chang's for almost all indices. In terms of general descriptives, Suárez uses more paragraphs than Chang, suggesting that she changes paragraphs at a higher frequency. Since *The Analects* is edited in the form of dialogues and quotations in which opinions and words are frequently exchanged, we can find more traits of paragraph break in Suárez's translation. Suárez uses shorter words than Chang does, hence reducing the readers' reading strain. Additionally, shorter words and more sentences contribute to creating a conversational ambiance. Regarding word selection, Chang's translation has a higher TTR, i.e., he uses a more extensive vocabulary repertoire, and as a result, his translation is more lexically diverse. More nouns are used by Suárez and Chang employs more adjectives. Both nouns and adjectives are content words; hence this observation cannot determine which translation is more comprehensible. In terms of textual overlap and connectives, Chang utilizes more connectives and repeats more arguments. Suárez's translation, on the other hand, presents a greater referential cohesion gap. The readability score is inversely proportional to the complexity of a text, and Suárez's translation outperforms Chang's translation in terms of readability.

The results as a whole appear to confirm an influence of translation direction in that native translators seem to have produced a more coherent and accessible text in the target language. The common consensus is that texts with longer words and lengthier sentences require more working memory and are, therefore, more difficult to process. An easily-read text should also contain less amount of vocabulary and simple syntactic structure. In light of these considerations, we may confirm that Suárez's translation is more coherent.

However, we argue that Chang's translation is not necessarily more challenging to read than Suárez's. First of all, we can notice that Chang makes excellent use of connectors to join different parts; this can form an explicit thread combining ideas for the reader and then help them to have a deeper understanding of the texts' logic. Best et al. (2005) also found that greater text cohesion improves reading comprehension and reduces the effort required for inferences. In addition, in the case study on native Arabic speakers' translation from their L1 to English, Campbell (2013) found that translators with a higher competence employ more lexicalization and produce shorter and denser text. Moreover, proficient translators exhibit a greater lexical variety ratio and a longer average word length. If we recall, Chang's translation has a greater TTR, indicating a high level of translation command in his L2. Syntactic complexity can also be explained by his great syntactic manipulation abilities in Spanish, which allows him to use more lexicalization and construct grammatically dense text. Further, Campbell (2013) adds that directly translated words are actually a manifestation of the translator's intention to play safe; those who are more prepared will redistribute the meaning of the source text across target word boundaries. Overall, this seems to suggest that Chang has a native-like competence in his L2.

Moreover, Chang demonstrates a high degree of comprehension in his mother language. *The Analects* is written in traditional Chinese, and it has a high density and grammatical versatility (C. W. Li, 2016), which can result in a wide variety of differences in translation (Hung & Pollard, 2009, p. 369). Some sayings are comprised of one or two sentences; thus, their meaning is sometimes ambiguous, and even modern Chinese scholars hold different interpretations of several passages. As Lee (2010, p. 11) suggests, reading *The Analects* necessitates not only textual information but also background knowledge. At least, Chang's translation reveals that he frequently explains cultural and historical background information so as to maintain the balance between the loyalty to the source text and the reception of the target reader. It is unclear if the discrepancy between some of our findings stems from translation directionality or other factors. This may also be due to translation direction, as non-native speakers possess a certain sensibility in decoding source text information that native speakers lack, but it may also be due to other translators' factors such as cultural identity (Q. Li, 2014).

Despite their mirror-image presentation, translating into and from a foreign language may not be the same. In the former, it is necessary to produce a natural translation of the target text, whereas, in the latter, accurate comprehension appears to be the greater challenge. From this perspective, Chang's translation appears to provide a more precise grasp of the ST. Even though his texts may be harder to read, his translation appears to combine correct comprehension of the source text with readability in the target text.

The goal of translation competence, in the end, is to reach a successful TT. For a target text to be successful, it has to be faithful to the ST, allowing readers of TT to retrieve the same information as the ST reader but also being natural and normal in TT (Neubert, 1981, p. 131). As a matter of fact, some theories do not make a clear cut between translation into and out of one's native language. For example, Vermeer expressed once that Skopos theory does not take into account translation directionality. It assumes that translators are bilingual and bicultural (cited in Pokorn, 2005, p. 29). Also, if someone uses both languages regularly and has lived in both cultures, it is possible to achieve a successful TT (Sofer, 2013, p. 18).

Furthermore, translation quality is not limited to direction alone. For instance, non-native translators can rely on advanced technology, such as corpora, to translate into the L2 successfully (Zahedi, 2014). Adab (2005) raises an interesting point of view concerning a restricted form of the second language. This form can be helpful for avoiding ambiguity in the target language, and if translators can operate adequately with its parameters, the direction of translation appears less relevant. Therefore, we find no reason to state an obvious advantage of native translators over non-native translators.

The results shed light not only on the translation directionality and cohesion but also on the approach used to quantify the comparison using Coh-Metrix-Esp. According to our results, native translators' rendition is more coherent and easier to read. Nonetheless, some features suggest that non-native translators can possess native-like competence in their L2 and produce a successful translation. Factors contributing to the difference observed in translation cannot be solely attributed to direction. The direct and inverse translation should not be placed on an axis of binary opposition (Stewart, 2000, p. 223) since neither is superior to the other. All features presented by both translations are equally worthy of investigation. Like Neubert and Shreve (1992, p. 7) have stated: "unnaturalness and necessity, loss and gain, destruction and harmony, integration and difference, are all properties of translation. They define its essential paradoxes".

In this study, some attempts have been made to provide objective data on a set of measures to determine the ease or difficulty of reading one translation. However, this study is still a long way from a comprehensive one to uncovering the characteristics presented by both translations, and some limitations must be acknowledged. However, we found some controversial information provided by the parameters obtained from Coh-Metrix-Esp. This suggests that these linguistic or textual features cannot operate independently but should be put into the context and situation in which the words are embedded. Studies on the Spanish translation of Chinese literature have made little use of computational tools for data analysis. This will necessarily involve seeking integration between computational tools and qualitative research.

In this paper, we have touched briefly on the possible difference between native and non-native translators. More research remains to be conducted from various perspectives based on these two full translations. A more thorough comparison between the two translations seems to be necessary. For instance, the readability score indicates that both translations differ greatly in Book 3, but the differences are not explored sufficiently in this study, and a detailed comparison may facilitate a more convincing description. Moreover, the present study is based on one language pair (Spanish and Chinese) and one translation direction, i.e., from Chinese to Spanish. Future research in the opposite direction may determine if this difference is driven by direction or by the translator. In addition, it is hoped that this study may inspire further research on the Spanish translation of Chinese literature and other translation-related topics.

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Author contribution statement

ZL conceived the study, collected part of the data, performed the analysis, and wrote the manuscript; CS collected and analyzed part of the data and revised the manuscript. Both authors contributed to the article and approved the submitted version.

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