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Introduction to the Volume

This volume includes articles based on the research projects presented at the 14th Lancaster University International Postgraduate Conference in Linguistics and Language Teaching (LAEL PG).

The LAEL PG conference is an annual international event with a long and successful history. The first event took place in 2006, and the 14th LAEL PG conference was held at Lancaster University on 11 July 2019. The goal of the conference is to give postgraduate students from various areas in linguistics, language teaching and language assessment an opportunity to present and discuss their research in an informal and intellectually stimulating environment of the department with world-class researchers. Since the conference is organised by postgraduate students of the Department of Linguistics and English Language, it also provides them with an opportunity to gain an invaluable experience of running international events and conducting peer-review. The 14th LAEL PG conference welcomed over 50 delegates and presenters from 21 universities from all over the world. The conference sessions covered a range of topics including Corpus Linguistics, Language Pedagogy, Critical Discourse Studies, Sociolinguistics, Pragmatics, and Language, Cognition & Communication.

The Papers from LAEL PG volume is an open-access online publication edited by Lancaster University postgraduate students. The volume features articles based on the research projects presented at the conference and provides the presenters with an opportunity to get an experience of double-blind peer-review process as well as assists in disseminating their research. This volume presents a selection of three papers in the areas of endangered languages, foreign language textbooks analysis, and the influence of language on cognition.

The volume opens with the paper *Borrowing and Language Vitality Assessment: Sardinian as a Donor Language in Comparison with Māori.* Gianni Onnis conducts an analysis of lexical borrowing from the endangered Sardinian language in a diachronic corpus of Regional Italian of Sardinia. Furthermore, he compares his findings to the similar previous studies of the borrowings from the Māori language in New Zealand English. By applying the UNESCO factors of language vitality framework, the author interprets the results of the studies to demonstrate how corpus analysis of lexical borrowings can help assess the influence of the endangered languages on the majority languages and the vitality of the former.

In the next paper *Mixed-Approach Analysis of Foreign Language Textbooks of English and French in Japan,* Martina Ronci aims at identifying the main didactic and lexical features of foreign language textbooks of such two popular languages studied in Japan as English and French. The author utilizes mixed methods to compare the didactic approaches and the linguistic features used to teach the topic of food and gastronomy in a corpus of English and French textbooks used in Japanese high schools. While acknowledging some similarities, Ronci highlights the differences between the English and French textbooks and makes assumptions regarding the factors causing these differences as well as the potential influence of the textbooks on students' motivation and learning outcomes.

Finally, Nadine Charanek in her paper *Visuospatial Working Memory of Serial Order in Humans and Chimpanzees: The Possible Influence of Language on Recall* explores the potential influence of language on the human visuospatial working memory. Based on an earlier study where chimpanzees and humans memorized and recalled a serial order of numerals, the author conducts a similar experiment involving English British monolingual university students performing a set of tasks in the form of an online game. Charanek compares her findings with the results of the original experiment to demonstrate in what ways language

can influence the capacity of visuospatial working memory in humans.

Borrowing and Language Vitality Assessment: Sardinian as a Donor Language in Comparison with Māori

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Abstract

This study tests the relevance of borrowings for the assessment of the vitality of two endangered donor languages: Sardinian and Māori. The vitality of these two languages has been analysed by quantifying their influence on the majority languages with which they interact, respectively Regional Italian of Sardinia (RIS) and New Zealand English (NZE). A RIS Corpus has been created by combining the methodologies employed by Macalister (2006) and Rankine et al. (2009), two corpus-based studies which analyse the presence of Māori borrowings in NZE. Sardinian borrowings have been quantified and different borrowing patterns have been used to speculate on UNESCO's (2003) vitality factors in order to assess the vitality of Sardinian. The results of Macalister (2006) and Rankine et al. (2009) in NZE have been reinterpreted accordingly, in order to obtain evidence of the vitality of Māori. The two languages show a positive response to new media and might have increasing intergenerational transmission rates. Nevertheless, Sardinian shows more limitations in domains of use and lower prestige than Māori. The results obtained therefore confirm UNESCO's evaluations, which consider Sardinian as a severely endangered language and Māori as a vulnerable language, proving the relevance of borrowing for language vitality assessment.

Keywords: borrowing, donor languages, UNESCO, language vitality assessment, corpus linguistics

1. Introduction

Nowadays, the spread of new media in a globalised market has multiplied the chances for languages to come in contact with each other. Language contact can be a source of enrichment for a language, by contributing to its linguistic repertoire, but at the same time, it can act as a source of threat for its vitality, changing the linguistic habits of its speakers (Crystal 2000). Linguistic borrowing can play a role in the endangerment of a language, by substituting its words and structures, leading to a progressive reduction of its domains of use (Thomason and Kaufman, 1992). The literature on borrowing has traditionally focused its attention on recipient languages, probably as a natural consequence of the fact that the effects of borrowing are only visible in recipient languages. But what value has borrowing for a donor language? Can borrowing provide evidence of the vitality of a donor language?

The aim of this study is to test the relevance of borrowing for the assessment of the language vitality of two endangered donor languages: Sardinian and Māori. The two languages are spoken on opposite sides of the world, Sardinia (Italy) and New Zealand, but are involved in very similar language contact situations. In both cases, language contact has taken place between a local indigenous language, Sardinian and Māori, and a later imported language, respectively Italian and English. Over time, in both contexts, the imported languages have acquired the status of majority languages. Still, they have changed under the influence of the local indigenous languages, to the extent that new majority language varieties have formed: Regional Italian of Sardinia in Sardinia and New Zealand English in New Zealand. On the other hand, Sardinian and Māori have over time become endangered minority languages.

The methodology chosen to carry out this research is based on two corpus-based studies which investigate the use of Māori borrowings in New Zealand English: Macalister (2006) and

Rankine et al. (2009). Macalister (2006) focuses on the diachronic change of New Zealand English under the influence of Māori, while Rankine et al. (2009) seek for evidence of the support granted to the endangered Māori in New Zealand English newspapers. The methodologies developed in these two research works have been employed to conduct an investigation of the Sardinian context by the creation of the Corpus of Regional Italian of Sardinia.

The analysis of the corpus has focused on lexical borrowings, given the fact that this type of borrowing occurs with higher frequency in language contact situations (Winford 2008) and generally precedes other forms of borrowing (Field 2002). Sardinian borrowings occurring in the corpus have been analysed in terms of frequency and semantic category. Their features have been associated with different factors of language vitality proposed by UNESCO (2003), allowing speculation on the vitality of Sardinian. Finally, the results obtained by Macalister (2006) and Rankine et al. (2009) on Māori have been reinterpreted according to the same language vitality framework, allowing a comparison between the language vitality of Sardinian and the language vitality of Māori.

2. Literature review

The theoretical basis of this research consists of three main topics, which will be discussed in the following order. A first section will consider language vitality and its components, as presented in UNESCO (2003). A second section will deal with lexical borrowing and its relevance for the study of language vitality, while a third section will provide a characterisation of the Sardinian and the New Zealand context, introducing the investigations carried out by Macalister (2006) and Rankine et al. (2009).

2.1. UNESCO's vitality assessment

As Roche points out, "vitality is not a property of a language itself, nor of a population that speaks a language, but rather a description of the relationship between a language, its speakers, and its wider linguistic, social, and political context" (2017: 193). A definition of language vitality is therefore necessarily operational and depends on the sociolinguistic factors one decides to take into account. UNESCO (2003) proposes nine factors to analyse language vitality; they are shown in Table 1.

Table 1. UNESCO's language vitality factors

Factor 1	Intergenerational language transmission
Factor 2	Absolute number of speakers
Factor 3	Proportion of speakers within the total population
Factor 4	Trends in existing language domains
Factor 5	Response to new domains and media
Factor 6	Materials for language education and literacy
Factor 7	Governmental and institutional language policies, including official status and use
Factor 8	Community members' attitudes toward their own language
Factor 9	Amount and quality of documentation

Factor 1 is based on Fishman's (1991) concept of intergenerational language transmission, which refers to speakers' ability to pass on their mother tongue to the next generation. According to this factor, the vitality of a language depends on its diffusion among all generations in a community of speakers. Factors 2 and 3 are of a statistical nature since they refer respectively to the number of speakers of a language taken in isolation and to the number of speakers of a language within the ethnic, religious, regional or national community they belong to. Factors 4 and 5 are both concerned with language domains of use: the former concentrates on the topics and purposes for which a language is used, the latter is mainly

oriented to the space granted to a language in new mediums, such as broadcast media and the Internet. Factor 6 can be related to factor 9, since both factors refer to the availability of materials in a language, in the first case for the sake of education and literacy (established orthography, grammars, dictionaries and literature), in the second case in terms of documenting material (grammars, dictionaries, as well as extensive texts and audio-visual recordings). Factor 7 considers the legal status enjoyed by a language while factor 8 refers to the social status enjoyed by a language in a community. In this sense, the two factors seem to fit Spolsky's (2004) framework of language policy, where factor 7 represents the language management component, as it includes all explicit language planning efforts made by a government in respect to a language, while factor 8 coincides with the language ideology component since it is concerned with the attitudes of a community towards its language(s).

In conclusion, it must be remarked that "none of these factors should be used alone" (UNESCO 2003: 7). A factor, taken alone, does not provide enough information to assess the vitality of a language. Indeed, even speaker's totals can be misleading, as Crystal (2001: 12) explains: "In many Pacific island territories, a community of 500 would be considered quite large and stable; in most parts of Europe, 500 would be minuscule".

2.2. Lexical borrowing, language vitality and language prestige

Lexical borrowing can be defined as the process involving the transfer of lexical material from a donor language to a recipient language (Zenner and Kristiansen 2013). As Kuteva (2017) reports, lexical borrowing is traditionally opposed to structural borrowing. The former affects the lexicon of a language by importing foreign sound-meaning pairs (loanwords; e.g., English *caribou* from Mikmaq *qalipu*) or through the morpheme-by-morpheme translation of foreign words, phrases or idiomatic expressions (loan translations/calques; e.g. French *presqu'île* from

Latin *paen-insula* 'almost-island'). The latter implies the importation of phonetic, phonological, morphological and syntactic features, therefore leading to changes in the corresponding language components. Given the greater sensitiveness of lexis to innovation, compared to the other language components, lexical borrowing tends to occur more frequently than structural borrowing (Winford 2008). Furthermore, it tends to precede structural borrowing diachronically, to the extent that "a significant amount of lexical borrowing is expected before one finds evidence of other 'interferences', i.e., actual structural borrowings" (Field, 2002: 3).

Literature on borrowing deals with language vitality in relation to two main aspects of borrowing: social motivation and language domains. Myers-Scotton (2006) analyses the social motivations causing the introduction of borrowings in a language and introduces the dichotomy between cultural borrowings and core borrowings. As the scholar explains, cultural borrowings are introduced in order to fill gaps in the lexical store of a language when new objects or concepts are imported in a language's culture. This is the case of computer-related words, which have spread to other languages together with the introduction of computers. On the other hand, core borrowings duplicate meanings already existing in the recipient language. This is the case of the use of greetings from French into Tunisian Arabic or from Spanish into northern Moroccan Arabic. According to Myers-Scotton (2006), these borrowings occur as the result of cultural pressure from the donor language, which occupies a dominant position compared to the recipient language. As the scholar explains, by importing core borrowings, the recipient language "loses some of its vitality" (2006: 230) to the donor language. The effects of cultural pressure on language vitality are also taken into consideration by Thomason and Kaufman (1992), who rather focus on the language domains affected by borrowing. They propose a borrowing scale establishing different phases in the borrowing process, as a fixed order where "features lower on the scale will not be borrowed before features higher on the scale are

borrowed" (1992: 73-74). As the scholars explain, the lower the position occupied by a language feature on the scale is, the greater the intensity of language contact and cultural pressure needed to cause its introduction is. At the same time, the scholars remark that overwhelming cultural pressure can have a negative impact on the vitality of a language. Therefore, it can be concluded that borrowings on lower positions on the borrowing scale might act as indicators of different degrees of endangerment of the recipient language since their introduction is due to higher cultural pressure from the donor language. Particularly, in the case of lexical borrowing, the scholars propose that non-basic vocabulary is borrowed before basic vocabulary, followed by different types of functional words.

As has been explained, when considering the relationship between borrowing and language vitality, both Myers-Scotton (2006) and Thomason and Kaufman (1992) analyse borrowings as instances of the cultural pressure exerted by the dominant donor languages on the subordinate recipient languages. Still, as Haspelmath (2009) points out, the concept of cultural pressure is too vague and intangible. The scholar rather prefers to talk in terms of 'language prestige', still acknowledging the difficulty in quantifying this factor influencing borrowing. A framework to analyse this element is introduced by Mühleisen (2002), who identifies three components of language prestige: language status (the legal condition of a language), language attitudes (social evaluations of the language within its community) and language function (what actions can be performed with a language). According to the scholar, these three components are interrelated as in a continuum in which prestige change can proceed according to opposite directions. It can take place as a top-down change triggered by political turns, therefore starting as a change in language status and then spreading to language attitudes and functions. The scholar understands this process as 'planned change', as opposed to 'natural change', which first occurs as a change in the functions of a language, triggered and reflected

by language attitudes, before having an effect on its status. Within the context of endangered languages, the revitalisation of French in Quebec, through the stipulation of the *Charter of the French Language* (Bill 101) in 1977, is certainly a case of planned prestige change, while an example of natural prestige change can be found in the increasing use of Occitan in music after the 1970s. As the scholar points out, planned change is a radical and fast process. Conversely, natural change proceeds at a slow pace, since it takes time for (micro-)function changes to affect language status, which is "the most static language prestige component" (Mühleisen, 2002: 33).

As a conclusion, language prestige can change over time, shifting the balance between dominant and subordinate languages in a contact situation and affecting the borrowing habits of a language. In the same way, changes in language prestige can have different effects on the vitality of a language and linguistic borrowings can act as indicators of these changes.

2.3. The two contexts

Sardinia and New Zealand offer two similar cases of language contact on a different scale. Both cases show the competition between an autochthonous language and an imported language, respectively Sardinian and Italian in Sardinia and Māori and English in New Zealand. In both cases imported languages have had the upper hand, acquiring the status of majority languages, but at the same time, changing under the influence of indigenous languages, to the extent that new language varieties have emerged, respectively, Regional Italian of Sardinia (RIS) and New Zealand English (NZE). On the other hand, indigenous languages have lost ground becoming endangered minority languages. The full picture shows two tripartite systems formed by endangered autochthonous languages, imported languages and new varieties of the imported languages. The difference between the two contexts derives from their geographical dimension.

Sardinia is a region of Italy where RIS has developed as a regional variety of Italian, having its standard on the nearby Italian mainland. On the other hand, NZE is a national variety of English which has originated far away from its standard's homeland.

Still, language contact has proceeded according to similar stages in both contexts, particularly from the 1860s on. The entering of Sardinia into the Italian State in 1861 (Piredda, 2016) and the establishment of the Native Language act (1867) in New Zealand (Grenoble and Whaley, 2005) paved the way for the pursuit of assimilation policies in favour of the imported languages in both territories, leading to a progressive endangerment of the indigenous languages. It was not until the 1970s that the course of events was changed by the insurgence of language activism movements, which favoured the recognition of autochthonous languages: Sardinian gained official status in 1999 (Vacca, 2017) while Māori was officially recognised in 1987 (Spolsky, 2003). Despite their legitimation, Sardinian and Māori still face endangerment: they both appear in the UNESCO's Atlas of the World's Languages in Danger, where Sardinian is labelled as definitely endangered language and Māori as a vulnerable language (Moseley, 2010).

On the other hand, in both contexts, the influence of autochthonous languages on the imported majority languages has attracted academic interest only in recent times, during the 1980s. Loi Corvetto (1983) was the first scholar to acknowledge the existence of a different non-standard variety of Italian in Sardinia, which took the name of Regional Italian of Sardinia. Similarly, during the 1980s New Zealand English attracted real scholarly interest; successively, *The Dictionary of New Zealand English* (Orsman, 1997) was published. And if the Sardinian influence on RIS has not become a topic of great interest in literature, if not in terms of descriptive studies, such as Loi Corvetto (1983) and Lubello (2016), the Māori influence on NZE English has attracted the attention of many scholars, particularly in the last decades.

Among them, Macalister (2006) studied the Māori lexical presence in NZE from 1850 to 2000. Differently, Rankine et al. (2009) focused their attention on intentional uses of Māori borrowings in NZE newspapers, in a representative sample from 2007. Both investigations rely on newspaper language corpora collected by sampling news data from different New Zealand dailies. They rely on Stempel's (1952) constructed week sampling method, which allows the creation of one or more constructed weeks through the selection of every Nth issue in a year of publication, starting from a random point in time and respecting a gap which dictates a one-day incrementation at each choice.

Macalister (2006) employs a diachronic perspective on the study of Māori borrowings in NZE. Data was collected from four New Zealand dailies with a long history of publication. The scholar established a set of six indicator years (1850, 1880, 1910, 1940, 1970, 2000) and then sampled a constructed week from each newspaper in each indicator year. The choice was further restricted to all news and opinions written in New Zealand about New Zealand matters. The corpus was then analysed together with data collected from parliamentary debates and school journals according to the same set of indicator years. The scholar found an overall increase in the use of Māori loans, which grew from 3.29 Māori words per thousand tokens in 1850 to 8.8 words per thousand in 2000. Proper nouns made up more than 90 per cent of the Māori word total in each indicator year. Non-proper nouns were divided according to the categories of flora and fauna, material culture (words referring to tangible objects of a culture, such as instruments, weapons and buildings) and social culture (words referring to non-material aspects of a culture such as abstract and religious concepts, relations of kinship and actions). Their frequency in the NZE Corpus increased particularly from the 1970s onwards, suggesting a recent expansion of the Māori vocabulary used in NZE. Indeed, the use of non-proper nouns grew in terms of tokens as well as in terms of types. Most particularly, from 1970 to 2000,

social culture types grew exponentially compared to the other non-proper noun types. The scholar finally identified three phases characterising the interaction between Māori and NZE: a progressive colonisation phase (until 1880), a recolonisation phase (roughly from 1880 to 1970) and a decolonisation phase (from 1970 onwards). As Macalister (2006) explains, the progressive colonisation phase and the decolonisation phase showed openness to borrowing, with greater numbers of Māori types occurring, while the recolonisation phase showed resistance to borrowing, therefore showing a change in attitudes during a period of English assimilation policy.

Rankine et al. (2009) analysed the intentional use of Māori words in NZE newspapers from a synchronic perspective. The scholars gathered 740 news articles by sampling two constructed weeks from New Zealand newspapers issued from February to March 2007. The selection of news was more focused on Māori lexis and included only articles containing at least one word or phrase from an arranged set of keywords about Māori topics. The analysis of Rankine et al. (2009) focused on the occurrence of Māori borrowings with an alternative in English. The scholars identified 199 Māori types, the majority of which belonged to the Social culture category (words such as *haka* 'war dance', *hapū* 'sub-tribe' and *tino rangatiratanga* 'Māori control and self-determination'), therefore, confirming Macalister's (2006) findings. On the other hand, the results obtained by Rankine et al (2009) "showed little evidence of support for New Zealand's endangered indigenous official language" (2009: 187).

3. Data and methods

This investigation applies the research methods developed by Macalister (2006) and Rankine et al. (2009) to the study of RIS. A RIS Corpus was created on the model of Macalister's (2006) NZE Corpus. Data was collected from the only two Sardinian dailies with such a long history

of publication to allow a diachronic analysis of the type of Macalister (2006): *L'Unione Sarda* and *La Nuova Sardegna*. Six indicator years were defined (1893, 1910, 1940, 1970, 2000, 2018) in order to analyse the widest time span available, at the same time, allowing comparisons with Macalister's (2006) data, at least from 1910 to 2000. Indeed, the only exceptions are 1893, which is the first year in which both newspapers were issued on a daily basis for the entire year, and 2018, which was chosen in order to obtain information on most recent trends characterising the use of Sardinian borrowings in RIS. A constructed week was sampled from each newspaper in each indicator year and the newspaper's content was then restricted to news and opinions produced in Sardinia and concerning the Sardinian context. The corpus obtained counts 2,572,006 word tokens and covers a time span of 125 years.

The analysis of the corpus focuses on native borrowings both from a diachronic point of view, as in Macalister (2006), as well as in terms of intentional use, as in Rankine et al. (2009). The RIS Corpus was processed with the software AntConc, a corpus analysis tool which allowed the creation of word lists and concordances, i.e. lists of all the instances of a word and its immediate context, where Sardinian borrowings could be firstly identified and where their contexts of use could be furtherly examined when needed. Code-switches have been counted and analysed together with borrowings since the two transfer types have been considered as being part of a continuum where code-switching as individual behaviour facilitates the normalisation of foreign forms as borrowings accepted by the whole community (Field 2002). Sardinian words have been analysed with regard to tokens, types and the semantic categories of proper nouns, flora and fauna, material culture and social culture. Material culture loans included names of Sardinian food (*malloreddus*, *casizolu*, *civraxu*), traditional clothes (*berritta*, *bertula*) or cultural monuments (*nuraghe*, *domus de janas*). Social culture types included traditional dances (*durdurinu*, *pass'e dusu*) and traditional rituals (*ardia*. *candelaria*). A

distinction of material and social culture types was not always straightforward as in the case of the term *pandela*, which has a material meaning ('standard', 'flag') as well as a social meaning ('role in traditional horserace'), therefore, requiring a deeper analysis of its concordances. The focus has also turned to Sardinian words with an alternative in Italian, which have been considered as core-borrowings, according to Myers-Scotton's (2006) framework.

The difference from the other two studies on NZE consists in the way borrowings are considered. Borrowings are not regarded as factors of language change, as in Macalister (2006), nor as evidence of the support granted to an endangered language, as in Rankine et al. (2009). Borrowings are here considered as pieces of evidence of the vitality of endangered donor languages. For this reason, different borrowing patterns have been associated to different UNESCO's factors of language vitality, as shown in table 2.

Table 2. Language vitality factors and corresponding borrowing patterns

UNESCO's factors	Parameters for Corpus Analysis
1) Intergenerational Language Transmission	Borrowing frequency (hypothesis) Semantic categories (hypothesis)
2) Absolute Number of Speakers	-
3) Proportion of Speakers within the Total Population	-
4) Trends in Existing Language Domains	Semantic categories
5) Response to New Domains and Media	Borrowing frequency
6) Materials for Language Education and Literacy	-
7) Governmental and Institutional Language Attitudes and Policies Including Official Status and Use	Radical change in borrowing rates Presence of cultural/core borrowings
8) Community Members' Attitudes toward their Own Language	Moderate change in borrowing rates Presence of cultural/core borrowings
9) Amount and Quality of Documentation	-

A preliminary remark should be made about factors 2 and 3, whose purely statistical nature shows resistance to a borrowing-based analysis. These two factors are rather supposed to be studied through the use of censuses and for this reason they have not been considered here. The other UNESCO's vitality factors have been associated with four borrowing patterns: frequency, semantic categories, change in borrowing rates and presence of cultural/core borrowings.

The frequency with which borrowings appear in the corpus can be used to provide evidence on three UNESCO's factors. It can show the acceptance of indigenous languages in media (factor 5): indeed, the use of native borrowings in newspapers shows the extent to which an indigenous language is accepted by the press (as in Rankine et al. 2009), suggesting similar trends in other media. Native borrowings can also play a role in literacy (factor 6), contributing to the creation of an established orthography, when missing in the donor language, through the choice of one spelling alternative among others. They might also be considered as material for language documentation (factor 9) as they constitute records of the indigenous language. Still, these last two factors have not been considered here since the relevance of native borrowings for language education and documentation is supposed to be minimal.

Semantic categories are supposed to provide evidence of the language domains in which the donor language is used (factor 4) and where it should be best preserved. On this matter, borrowing frequencies and semantic categories can be combined to formulate hypotheses on the extent of intergenerational transmission (factor 1) of the donor language. Indeed, when language maintenance allows language transmission (Fishman 1991), the introduction of higher frequencies of native borrowings with the involvement of more semantic categories, in a specific period of time, might indicate that a bilingual community still preserves and transmits some kind of knowledge of the donor language to allow the understanding of such borrowings, particularly in the case of code switches. Therefore, a hypothesis can be formulated, which must be necessarily tested on the donor language, to make sure that the knowledge of autochthonous words in a bilingual community corresponds to an actual competence in the donor language.

Changes in the rate of borrowings can be associated with factors 7 and 8, based on Mühleisen's (2002) prestige change framework. According to this framework, the planned

change reflects changes in governmental attitudes (factor 7) and since it is a radical process, it should bring about dramatic changes in the occurrence of native borrowings. On the other hand, natural change is a gradual process which affects language attitudes (factor 8) before having an effect on language status, therefore, it should manifest itself by means of moderate changes in the native borrowing rate.

Finally, Myers-Scotton's (2006) dichotomy between cultural borrowings and core borrowings can be used to investigate on the prestige of the donor language, where higher frequencies of core borrowings are associated with greater institutional (factor 7) and social (factor 8) recognition of the donor language.

4. Results and discussion

The analysis of Sardinian borrowings in the RIS Corpus shows four main results:

- the Sardinian language has been increasingly used in news communication;

- intergenerational transmission might have received a new impulse after 1970;

- domains of language use are restricted;

- the government and the community have recently supported the use of Sardinian, but its prestige is still low.

As in Macalister (2006), the frequency of indigenous borrowings registered in each indicator year has been combined to create a diachronic picture showing the occurrence of Sardinian borrowings in RIS during the analysed time span (Figure 1.). The frequency of Sardinian borrowings decreases from 1893 to 1910, the year in which the lowest numbers of Sardinian tokens have occurred. 1910 also marks the starting point of a rising trend which reaches its peak in 2000. During this time lapse, the frequency of Sardinian borrowings increases from 1.1 to 7.2 words per thousand tokens, before decreasing again in 2018, where

6.2 Sardinian words per thousand tokens occur. On the one hand, the distribution of Sardinian tokens along with the corpus clearly reflects the phases which have characterised the Sardinian language policy, showing low borrowing frequencies during the period of Italian assimilation policy, a first dramatic increase in 1970, during the period of Sardinian language activism, and again in 2000, soon after the official recognition of Sardinian. On the other hand, considering the use of Sardinian in RIS newspaper language, the overall increase in the use of indigenous borrowings shows that the Sardinian language is coming into use in press communication and probably in other media as well.
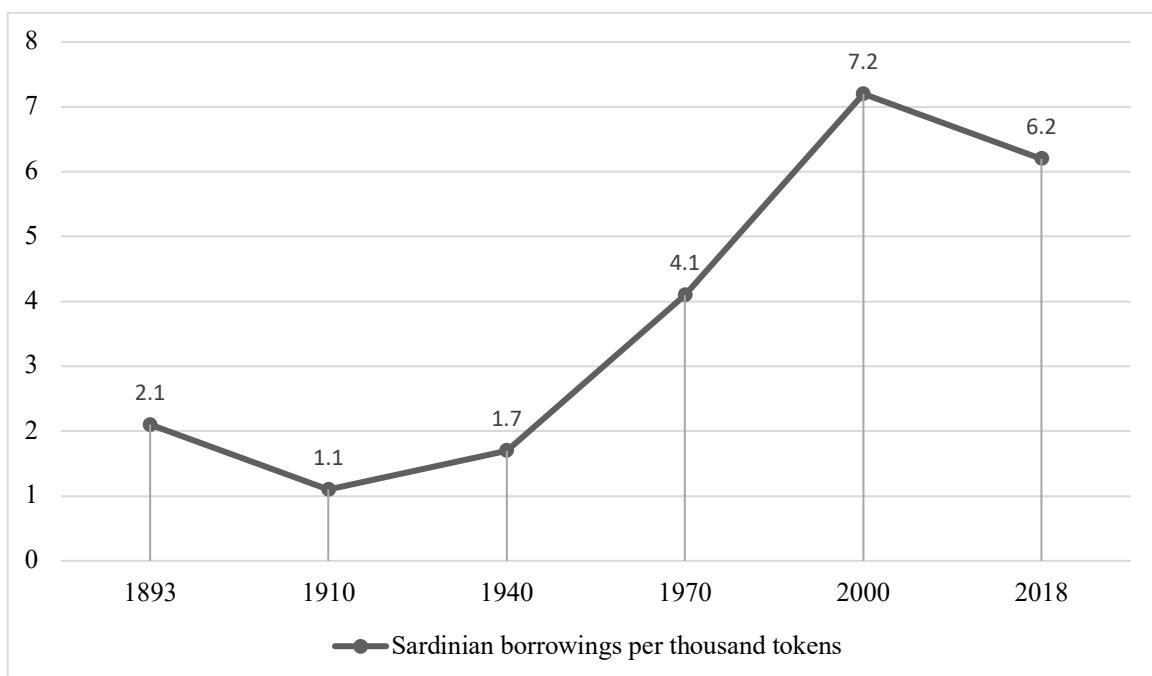

Figure 1. Sardinian borrowings per thousand tokens

The total amount of Sardinian borrowings in each indicator year has then been decomposed in terms of proper noun tokens and non-proper noun tokens (Fig. 2). It is not surprising to note an overwhelming presence of Sardinian proper nouns, which make up more than 94 per cent of the total Sardinian tokens in each indicator year, as this is a natural consequence of the referential style of news language. On the other hand, an analysis of the

distribution of Sardinian non-proper nouns, i.e. content words referring to flora and fauna, social culture and material culture, allows the formulation of a hypothesis on the phases which might have characterised the intergenerational transmission of the Sardinian language. If the presence of Sardinian content words is very low until 2000, making it difficult to obtain a clear picture of the process of intergenerational language transmission during the period of Italian assimilation policy, the dramatical increase of Sardinian non-proper nouns (both in terms of percentual distribution and absolute token numbers) in 2000 and in 2018 calls for considering an increment in the intergenerational transmission of Sardinian after 1970. But if intergenerational language transmission might have been strengthened, in which contexts might it be at work?


	1893	1910	1940	1970	2000	2018
≡ Non-proper nouns tokens	25	3	17	24	197	212
⊞ Non-proper nouns percentage	5.7%	0.8%	2.5%	1.2%	3.1%	5.9%
⊡ Proper nouns percentage	94.3%	99.2%	97.5%	98.8%	96.9%	94.1%
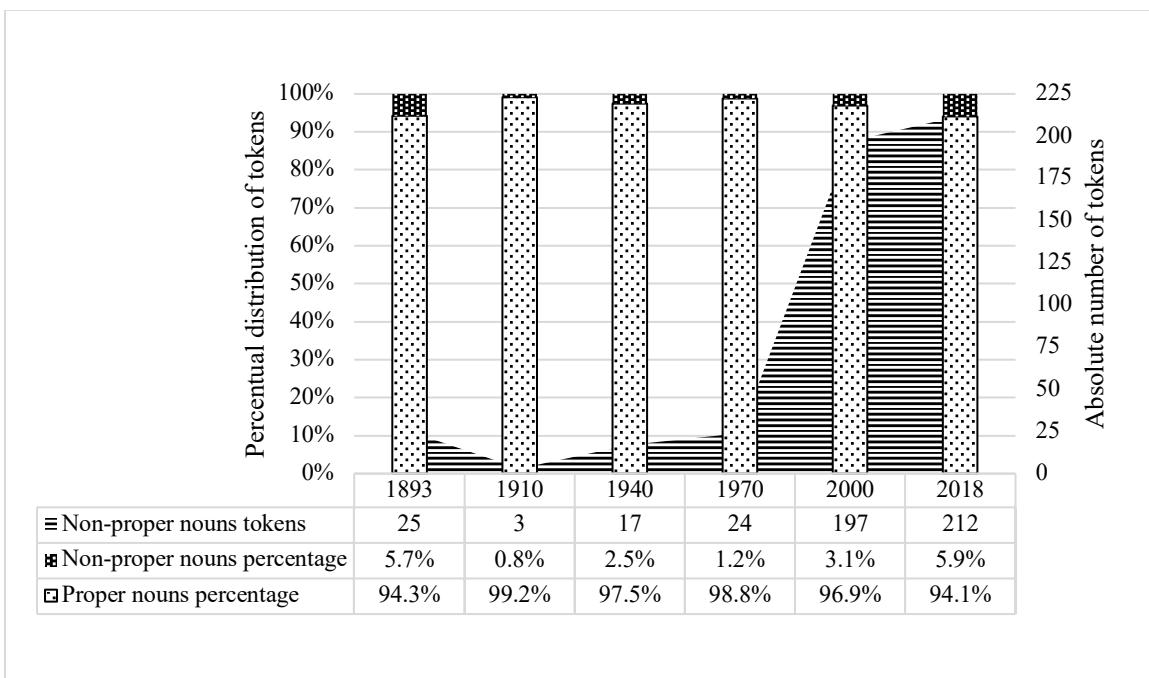
Figure 2. Percentual distribution of Sardinian proper nouns and non-proper nouns in each indicator year

Table 3 shows the total amount of Sardinian non-proper noun types occurred in each indicator year and their distribution according to the semantic categories of flora and fauna, material culture and social culture. Altogether, the number of Sardinian non-proper noun types

found in the RIS Corpus totals to 88 types. If only 10 of them appear in 1970, their amount almost quintuples in 2000, where 49 types occur, while a moderate increase characterises the year 2018, which counts 64 types. Seen from the perspective of Mühleisen's (2002) prestige change framework, these variations in type rates can be associated with different processes of change in the Sardinian language prestige. The radical upsurge of type figures in 2000 can be considered as the result of planned change, acting as an indicator of the positive effects of governmental efforts to promote the Sardinian language during the 1990s. On the other hand, the moderate increase in the Sardinian type rate in 2018 would suggest a switch to a bottom-up natural change, fuelled by positive community attitudes.

Indicator years	Types total	Flora and fauna	Material culture	Social culture
1983	7	-	4	3
1910	1	-	-	1
1940	5	-	4	1
1970	10	-	7	3
2000	49	-	30	19
2018	64	1	38	25

Table 3. Distribution of non-proper noun types in the RIS Corpus

The semantic classification of Sardinian types occurred in each indicator year provides insights on the language knowledge which is supposed to have been transmitted throughout the analysed time span. The lack of Sardinian loanwords belonging to the category of flora and fauna is not surprising, given the great similarity between the Sardinian territory and the Italian mainland. On the other hand, if the categories of material culture and social culture appear to be almost equally represented in 1893, their proportion changes as the total amount of

borrowing types increases. Indeed, the indicator year 2018 shows the most unbalanced representation of these two categories: of the 88 types found in the whole corpus, 38 appear in the material culture category (43 per cent on the total) and only 25 appear in the social culture category (28,4 per cent on the total). This implies that the knowledge which has been transmitted from generation to generation has impoverished since the social culture vocabulary has been increasingly less transmitted. Indeed, some words seem to have been lost on the way: for example, the social culture words *gosos* ('religious chants in honour of saints') and *mutos* ('a genre of songs in rhymes') have been recorded only in 1893 and do not occur in the rest of the corpus. An analysis of the main topics touched in 2018 shows that almost all the types occurring in this year can be related to a few topics, which are: the Sardinian cuisine (names for typical dishes such as *coccoi*, *fregula*, *lorighittas*), Sardinian traditional garments (*berritta*, *cambales*), traditional celebrations (*iscravamentu*, *intregu*), traditional music (*canto a tenores*) and traditional dance (*annanza*, *pass'e dusu*). This means that the Sardinian language knowledge and use have been preserved only in restricted language domains, losing ground to Italian in others.

It is not a coincidence that the only flora and fauna type found in the corpus has been recorded in the indicator year 2018. This Sardinian word (*babaiole*, "ladybugs") is a clear example of core borrowing, according to Myers-Scotton's (2006) framework, and indicates higher prestige of the donor language both in terms of legal condition and social position enjoyed. Only 14 core borrowing types were found in the corpus. They all appear in the indicator years 2000 and 2018 and have a minimal proportion within the total word tokens of each year (Table 4). They show that, although the prestige of Sardinian has increased in the last decades, this language still occupies a subordinate position, both legally and socially, compared to the Italian majority language. The higher presence of social culture types is

probably due to the fact that Sardinian words related to abstract elements of culture are more prone to carry semantic nuances missing in Italian alternatives, compared to Sardinian loanwords referring to material objects of culture.

Indicator year	Types total	Semantic categories			Proportion of tokens within the total of the year
		Flora and fauna	Material culture	Social culture	
2000	10	-	4	6	0.004 %
2018	11	1	5	8	0.005 %

Table 4. Intentional use of Sardinian words in 2000 and in 2018

By comparing the results of this study to the results obtained by Macalister (2006) and Rankine et al. (2009) it is possible to identify two main differences between the vitality of Sardinian and the vitality of Māori. By a reinterpretation of Macalister's (2006) results, it is possible to state that, like Sardinian, Māori has been recently used more frequently in newspapers and its intergenerational transmission might have improved particularly after 1970, as a result of governmental support and positive community attitudes. Indeed, Macalister (2006) noticed an overall increase of Māori tokens throughout the corpus with a dramatic upsurge of non-proper noun types in 1970. Still, the higher presence of Māori social culture types detected in the NZE Corpus represents an opposite trend in respect to the distribution of Sardinian borrowings in the RIS Corpus. This suggests that, over time, the abstract aspects of the Māori culture have been better preserved than in the Sardinian case. In other words, it appears that, to a certain extent, Māori has maintained the link between material objects of culture and their deeper social meaning. Differently, the knowledge of Sardinian which has been handed down from one generation to the other has progressively impoverished so that what remains today of the Sardinian language are mostly material elements of culture which act as symbols of an

emptying Sardinian culture. The same happens to the language domains in which the two languages are used: a glance at the glossaries reported by Macalister (2006) and Rankine et al. (2009) suggests that Māori is increasingly used in institutional contexts, such as politics and the school, as well as in private households. On the other hand, Sardinian appears to be relegated to traditional and religious contexts, and its use outside these domains is sporadic.

Finally, a reinterpretation of the results obtained by Rankine et al. (2009) in terms of the presence of indigenous core borrowings shows that Māori enjoys more support at an institutional level and a better reputation in New Zealand society. Indeed, even if the rate of Māori core borrowings is very low in their corpus, it is far higher than the frequency of Sardinian core borrowings found in the RIS Corpus. The higher specificity of the data selected by Rankine et al. (2009), through the use of Māori keywords, certainly plays a role in the divergence between the results found in the Sardinian case. Still, this divergence must be related also to a difference in the prestige enjoyed by the two endangered languages.

In conclusion, the divergences existing between the use of native borrowings in the two contexts confirm UNESCO's statement of the vitality of Sardinian and Māori, with Sardinian being severely endangered and Māori being vulnerable.

5. Conclusions

The results show that the study of borrowing from the perspective of donor languages can provide evidence on at least five UNESCO's (2003) factors of language vitality: allowing the formulation of a hypothesis on the condition of a language's intergenerational transmission, defining domains of language use, proving its response to new media, and identifying the polarity of governmental and community attitudes towards it. In this sense, the study of

borrowings can provide practical data to support censuses' data when assessing the vitality of endangered languages involved in contact situations.

As far as Sardinian and Māori are concerned, the results obtained in this study are coherent with UNESCO's judgment on the vitality of these two languages. Nevertheless, more data gathered from oral sources in different contexts, from private to public domain, might provide much more evidence on the extent to which these languages are maintained and on their domains of use in more informal contexts.

Furthermore, the Sardinian and the Māori contexts offer very similar cases of language contact. Therefore, this method of analysis should be applied to different languages and different language contact situations, in order to measure the extent of its applicability, given the unpredictable ways in which languages borrow and land linguistic material from one another.

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Mixed-Approach Analysis of Foreign Language Textbooks of English and French in Japan

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Abstract

Studies on compulsory foreign language (L2) education in Japan often highlight inconsistencies between English textbooks and the policies defined by the Ministry of Education, criticising the way EFL is taught. In order to represent L2 education in a broader way, this article investigates a wider corpus with a double framework. To get a clearer view of L2 education in Japan, a corpus of textbooks for English and French as foreign languages was collected. The contents of the textbooks were examined through language teaching methodology and discourse analysis, to outline the main features of the materials, as well as the implicit representations of the students and the world that they convey. This analysis delves into several issues, such as how foreign languages are studied in Japan and for what reasons, how high schoolers are implicitly portrayed in Japanese L2 textbooks, what is expected from them, and whether or not those expectations depend on the language at issue (English/French). The preliminary findings presented in this paper also seem to suggest that behind a superficial didactic contradiction, a deeper connection with Japanese fundamental education laws can be seen.

Keywords: discourse analysis, foreign language teaching, textbook analysis, Japan

1. Introduction

'Foreign language' teaching in Japan is often perceived as a synonym of the teaching of 'English as a foreign language' (EFL), especially when it comes to compulsory education. However, English is not the only foreign language to be taught in schools, especially in high schools. For this reason, focusing on EFL in order to describe the situation of L2 education contributes to reinforcing the paramount place of English and underrepresentation of other foreign languages. This article stems from a larger PhD research that was nourished by the aforementioned consideration. The research aims to provide a broader picture of L2 education in Japan through a comprehensive analysis of textbooks conceived for Japanese high schools. The compulsory nature of high school education and the undiscussed importance of textbooks in the teaching context, especially as far as EFL goes[1], should allow for more representative results than a case study on specific class activities. In order to discern if the patterns found in L2 textbooks depend on their nature (language teaching materials) or on the language itself (e.g. English), this paper will consistently compare a corpus including textbooks of both English and French as a foreign language (FLE, *Français Langue Étrangère*). The analysis and comparison of both should allow for a clearer definition of their characteristics and the purposes that each of them seems to serve, providing observations that could inform L2 teaching in general.

Addressing more specifically the subject of EFL, research has been pointing out issues in the way it has been taught in Japan ever since the late 80s. Scholars especially denounce the inconsistencies between an inefficient EFL teaching and the guidelines provided by the Japanese Ministry of Education (MEXT) for L2 teaching. Even if the latter has been fostering

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[1] Publishing companies of EFL textbooks go as far as to provide complete scripts of the whole course for the teachers to read (Langham, 2007: 8).

communicative approaches since 1989, the implementation of new curricula appears to be hindered by multiple factors, with both academia and the media criticising Japanese English education. To understand the reasons behind these inconsistencies, a more comprehensive study needs to be conducted first, in order to define whether the patterns found in EFL textbooks present homogenous features or if said features depend on the language in question. For this reason, this article will focus on bringing to light the global features of L2 textbooks in Japan both from a didactic and a discourse point of view. Further analysis on the way EFL textbooks' most salient features can or cannot be linked to MEXT's guidelines will not be discussed here (for more details, see Ronci, 2020). Hopefully, choosing an unprecedented cross-L2 textbook analysis drawing on both didactics and linguistics methodologies will represent the situation of foreign language teaching in Japan in a broader way and help discern the main features of the textbooks for further analysis.

2. Literature review

In the last decades, English education in Japan has been at the centre of debates both in the academic world and in the public discourse. Global proficiency comparisons highlighted the nation's low ranking in EFL tests, which led to the shared belief of Japanese English education being "a fiasco" (Miyake, 2019). New courses of studies were implemented in order to improve the country's results and to raise international standards, with mild consequences and criticism from the academic sphere. Ever since Gorsuch's pioneering study (1998) and Browne and Wada's survey (1998) on EFL in Japanese high schools, many scholars have analysed English education in Japan, investigating education policies (Hatori, 2005; Kikuchi & Browne, 2009; Aspinall, 2013) and the situation of EFL. Overall, studies point out difficulties in implementing a communicative approach in EFL teaching, sometimes questioning their suitability and criticising the impact of English on national curricula, sometimes taking this fact as a given

and trying to suggest possible solutions.

Recently, textbook analysis has been increasingly adopted in the field of Japanese EFL studies, with scholars describing the diachronic evolution of learning supports (Weir & Ozasa, 2010; Honda & al., 2018) and synchronic studies analysing the portrayal of culture (Kawano, 1982; Reimann, 2009), gender (Lee, 2016, 2018) and diversity (Otlowski, 2003; Hanashiro, 2016) in the textbooks. Studies that link the political and textual spheres, describing new textbooks as contradictory in relation to the government's guidelines (Browne, 1998; Humphries, 2013; Glasgow & Paller, 2014) also informed this research.

While research on EFL in Japan is prolific, less attention has been paid to the teaching of other L2 *outside* of university contexts (with the exception of recent remarkable works on FLE by Mogi & al., since 2017). Despite high schools providing courses in foreign languages other than English being uncommon, their existence cannot be denied and should serve as a means of comparison to get a better and wider view on L2 education in Japan. According to the Japanese government, the most studied foreign languages (other than English) in high schools are Chinese, Korean and French, the latter of which counts thrice the students of Spanish or German (MEXT, 2019a: 21). While some studies focused on the comparison of EFL textbooks from different Asian countries (Takeda & al, 2006; Wang, 2012), a cross-L2 analysis of Japanese textbooks produced for the same public seems to be unprecedented. Given that dealing with discourse analysis tools requires a deep knowledge of the language and culture at issue to provide a reasonable interpretation of the results, the choice was quickly restrained to English and French (that also happen to be the two most-studied Indo-European languages in the country). Naturally, other studies encompassing more foreign languages would be welcome to further represent the overall situation of L2 education in high schools.

3. Data and methods

To portray a broad picture of L2 education in Japan, the question of choosing representative textbooks for a research corpus became a delicate one. Out of the 800 textbooks selected by the ministry for high schools, a list of English publications is provided and catalogued in multiple categories (MEXT, 2019b). Titles were chosen from each category (except "basic English communication"), incorporating different publishing companies in the analysis. Despite the lack of a designated list of French textbooks in MEXT's guidelines, the active participation of high school teachers in conferences and academic research made it possible to get an insight into FLE teaching and to draw up a list of currently used supports. Figure 1 shows the textbooks collected for the main corpus of this study.

EFL		
TITLE	**REF.**	**PUBLISHING COMPANY**
MY WAY (New Edition)	MW1	Sanseidō
CROWN 1 (New Edition)	CR1	Sanseidō
NEW ONE WORLD (Revised Edition)	NOW	Kyōiku
PROMINENCE	PRO	Tōkyō Shoseki
CROWN 2 (New Edition)	CR2	Sanseidō
Unicorn	UNI	Bun-Eido
Vision Quest Standard (Revised Edition)	VQ1	Keirinkan
My Passport	PAS	Bun-Eido

FLE		
TITLE	**REF.**	**PUBLISHING COMPANY**
En Scène I	ES1	Sanshūsha
En Scène II	ES2	Sanshūsha
Mon premier vol Tokyo-Paris (Nouvelle édition)	VTP	Surugadai
Amélie et Kenzo	A&K	Asahi
Moi, je…	MJE	Alma
Navi.fr	NAV	Asahi
Destination Francophonie	DFR	Surugadai
À la découverte	ALD	Daisan Shobō

Figure 1. Textbooks in the corpus ("REF" stands for the way the texts will be referred to)

Then, in order to compare similar sets of data, the same theme was chosen from every textbook. Comparing textbooks in terms of topics proved to be very useful, as only 'food/gastronomy' was found to be a common theme between the EFL and FLE textbooks. Although the larger research this article draws from analyses more than just one theme, for the purposes of this paper the results presented here will be related to the food lessons only. Once the common theme was found, every lesson in both EFL and FLE textbooks was analysed through two lenses: the didactic framework provided by Littlejohn (see Figures 2 and 3) and the linguistic

framework in Figure 4.

Because of the multi-linguistic nature of the corpus, data were collected in English, French and Japanese. Given the qualitative nature of the approach[2], the corpus presenting multiple writing systems was not problematic: for the didactic analysis, the differences between L1 and L2 instructions or contents were considered irrelevant. Regarding the linguistic analysis, the main phenomena at issue being of a translingual nature, items were first classified together regardless of the language[3], then analysed in more detail to understand how each language was portrayed in the corpus. Of course, some exceptions and limitations were also considered and will be concisely presented when needed.

The choice of the methodological frameworks was also important to try and get the most comprehensive view of the textbooks as possible, so a multi-method approach was adopted. With respect to the didactic methods, Littlejohn's framework (2011) for the analysis of foreign language textbooks proved to be particularly useful because of its comprehensive criteria as well as its detailed and empirical nature. This study will focus on the section of Littlejohn's framework that deals with the analysis of tasks, presented in terms of *turn-take*, *focus* and *mental operation*, as can bee seen in Figure 2.

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[2] Some quantitative considerations will also be provided to get a more immediate picture of the results.

[3] For instance, modality can be expressed in various ways in English, French and Japanese, but this aspect exists in the three languages, so it is possible to get an overall picture of its presence in L2 textbooks.

I. What is the learner expected to do?	
A. Turn Take	**B. Focus**
Initiated	Language system (rules or form)
Scripted response	Meaning
Not required	Meaning/system/form relationship
C. Mental operation	
Repeat identically	Compare samples of language
Repeat selectively	Analyse language form
Repeat with substitutions	Formulate language rule
Repeat with transformations	Apply stated language rule
Repeat with expansion	Apply general knowledge
Retrieve from STM/working memory	Negotiate
Retrieve from LTM	Review own FL output
Formulate items into larger unit	Attend to example/explanation
Decode semantic/propositional meaning	Research
Select information	Express own ideas/information
Calculate	Translate
Categorise selected information	Learn by heart
Hypothesise	Dictation
II. Who with?	
Teacher and learner(s), whole class observing	Learners in pairs/groups; class observing
Learner(s) to the whole class	Learners in pairs/groups; simultaneously
Learners with whole class simultaneously	Learner individually outside the class
Learners individually simultaneously	

III. With what content?			
A. Input to learners		**B. Output from learners**	
Form	Graphic	Form	Graphic
	Words/phrases/sentences: written		Words/phrases/sentences: written
	Words/phrases/sentences: oral		Words/phrases/sentences: oral
	Extended discourse: written		Extended discourse: written
	Extended discourse: oral		Extended discourse: oral
	Graphic		Graphic
	Words/phrases/sentences: written		Words/phrases/sentences: written
	Words/phrases/sentences: oral		Words/phrases/sentences: oral
	Extended discourse: written		Extended discourse: written
Source	Materials	Source	Materials
	Teacher		Teacher
	Learner(s)		Learner(s)
	Outside the course/lesson		Outside the course/lesson
Nature	Metalinguistic comment	Nature	Metalinguistic comment
	Linguistic items		Linguistic items
	Non-fiction		Non-fiction
	Fiction		Fiction
	Personal information/opinion		Personal information/opinion
	Song/Clip		Song/Clip

Figure 2. *Framework for the analysis of language textbooks*

The first section checks whether the students are asked to initiate speech (e.g. free discussion), to answer following a script or whether no response is required. The second one explores what the textbooks expect the students to focus on, be it the language system (e.g. grammar exercises), the meaning or the link between both (e.g. textual cohesion). Finally, the third one encompasses a large variety of activities the researcher can choose from (see Appendix 3 for examples). Littlejohn then suggests differentiating the participants of each activity and, finally, detailing the contents' *inputs* and *outputs* in terms of form, source and nature. Littlejohn's framework can be presented through a series of questions outlined in a table with a number of columns equivalent to the exercises and activities of each lesson (plus one, for the questions). For the analysis that served this research, each activity was scrutinised, with one or multiple squares being ticked depending on what could be observed (as in Figure 3[4]).

LESSON 6																					
Task number:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
I. What is the learner expected to do?																					
A. TURN TAKE																					
Initiate																	X				X
Scripted response																					
Not required	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	
B. FOCUS																					
Language system (rules or form)				X				X			X	X			X	X			X		
Meaning	X	X			X	X			X	X			X	X			X			X	
Meaning/system/form relationship			X				X											X			X

Figure 3. Part 1 of 3 of the analysis of New One World using Littlejohn's framework

Some simple quantitative data were collected in order to compare multiple pages of results more easily. Summing every "x" as a "1" allowed for an immediate examination of the trends of each textbook and an easy comparison of the EFL/FLE corpus (as shown in Appendix 2). When coupled with the linguistic ones, these results proved to be significant in portraying the

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[4] Although the examples in Littlejohn's publication are very helpful in providing a clear definition of what every item corresponds to, the author feels that an experience as L2 teacher is often required for the reliability of the analysis and recognises her own teaching background helped in the interpretation of the tasks.

characteristics of each set of L2 textbooks.

In addition to Littlejohn's framework, discourse analysis was needed in order to provide a better understanding of the message and the cultural dimension of the textbooks. Although the reflections behind the linguistic analysis of the corpus were informed by research from both the English-speaking and French-speaking world, a complete and detailed report of such a study would not fit the scope of this publication. For the sake of brevity, the results will be presented starting from Hyland's framework for stance and engagement in academic discourse (2008), edited so that it separates *mentions* from the categories of *stance* and *engagement*, and include Kerbrat-Orecchioni's categories (2014) for the analysis of attitude markers. This comprehensive framework can be seen in Figure 4. Appendix 1 provides definitions and examples both from the scholars and from this analysis.
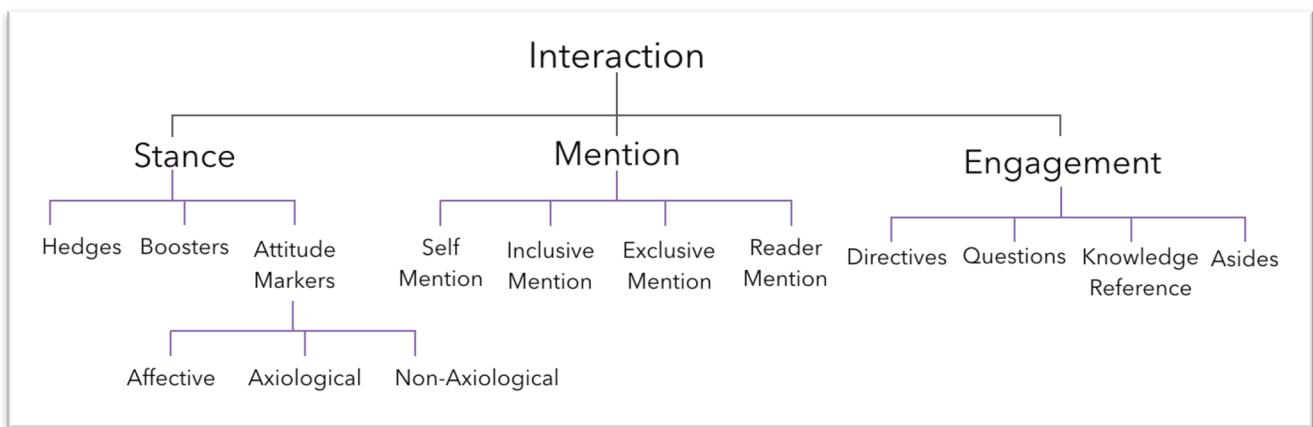
Figure 4. Hyland's edited framework for academic writing and Kerbrat-Orecchioni's for attitude markers

The very large nature of the operating notions that Hyland draws upon allows for an overall view of linguistic features in both EFL and FLE textbooks that should serve to answer the research question about the characteristics of both. If the corpus presents the same features in English and French, those elements could be considered as typical of the 'foreign language textbook' genre. However, wherever peculiarities come up, they could be used to differentiate

each L2 textbook more clearly and possibly inform language teaching in general. Before going into detail, it should be noted that some adjustments have been made to Hyland's original framework in order to adapt it from the analysis of academic writing to that of language textbooks (cf. Appendix 1).

Regarding the analysis of attitude markers, although the framework provided by Martin & White (2005) also informed this research, the results will be presented using Kerbrat-Orecchioni's classification. In her works on enunciation, the scholar labels adjectives as *classifiants* ('objective' adjectives, such as "blue") and *non-classifiants* (subjective ones), further dividing the latter into three categories (cf. Appendix 1 for definitions and examples). Although her distinctions resemble Martin & White's, their classification of *reaction* in the *appreciation* range seemed somewhat problematic (for instance in categorising occurrences such as "surprising" that belong to both). The framework provided by the French scholar appeared to leave less leeway to the researcher's subjectivity, so it was used to analyse items in both EFL and FLE textbooks.

The analysis was conducted manually: every lesson was studied and every relevant linguistic marker duly noted in a table sheet where the items would be divided following Hyland's keywords, then presented with their co-text, highlighted, and commented. Every marker was then presented in a more comprehensive table (with only the occurrences and the immediate co-text) to discern general trends, discrepancies and heterogeneous characteristics[5]. An example of this can be found in Figure 5: this table easily allows to see that *attitude marker*s are very common in all EFL textbooks except one: only four occurrences were found in the

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[5] That could probably be linked to the author's style more than a general tendency of the textbooks' genre.

third book.

Figure 5. EFL textbooks, attitude markers (1/2)

The number of occurrences itself was not vital for the sake of the analysis, but counting them provided a more comprehensive view of the corpus and allowed for easier comparisons of patterns and differences.

Although it can be easily observed that EFL textbooks tend to have more hedges than boosters, whereas the opposite trend exists in FLE publications, this mere description does not suffice in discourse analysis. For this reason, after organising the linguistic items in categories, it was important to draw bridges between them, in order to explain discourse patterns and better understand how authors build a relationship with readers in EFL and FLE textbooks. Finally, some preliminary interpretations hinting at deeper relationships between EFL textbooks and

Japanese laws and culture were addressed.

4. Results

Littlejohn's framework is divided into three main sections: what the learner is expected to do, with whom, and with what content. In terms of expectations, the analysis showed that *turn-take* is mostly not explicitly required, both in EFL and FLE textbooks[6]. The latter tend to present more expression activities (speaking and writing) than the former, although they are usually scripted, while EFL's sparse expression activities are usually initiated and unguided. Concerning the *focus* of the activities, FLE is often centred on the form and the linguistic items (e.g. learning a vocabulary list), while EFL's biggest concern seems to be the proper understanding of the meaning through language (with fewer exercises about language items and more reading questions or content-related activities). Some similarities could be found in the category of *mental operations* (see Appendix 3): for instance, regardless of the operation at hand, both EFL and FLE tend to rely on short-term memory for their questions and exercises; however, learners are mostly asked to repeat identically or with substitutions in FLE, while in EFL repetitions come with a transformation, which can be more complex [7]. Another characteristic of EFL is that students are assigned a larger amount of comprehension tasks and research; they are also sometimes expected to express personal opinions and even to translate texts in their L1 to check their understanding of the contents.

When reflecting on the students' interactions (as explicitly mentioned in the textbook), it can be noticed that both EFL and FLE learners work mainly individually and simultaneously.

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[6] See Appendix 2 for a comprehensive table showing simple quantitative data. See Appendix 3 for examples and explanations for each category of the *mental operations*.

[7] A difference probably explained by the proficiency gap (FLE: beginner, EFL: intermediate), for transformations are more difficult than repetitions.

Specifically, EFL instructions also reflect a class practice of taking turns in front of the whole class (for individual responses or student-teacher interactions). In FLE this trend does not exist, but there are multiple explicit mentions of pair work.

Additional distinctions came to light regarding the contents of the textbooks in terms of *input* and *output*, as mentioned in Littlejohn's framework. For example, FLE authors seem committed to balancing the text, audio and pictures in their volumes. The same cannot be said about EFL textbooks, whose main input is the written text: its importance is emphasised throughout the books and even listening exercises are accompanied by a text (keywords, transcriptions, translations). The vast majority of pictures in EFL is used to accompany a long, written text or to elucidate vocabulary and not as the core of an exercise. Another difference is that FLE supports tend to be extremely short (sometimes just a couple of lines), while EFL features extended texts (usually multiple pages). This can be partially explained by the level gap between them; however, it should be noted that junior high EFL supports also include texts spreading over multiple pages and that older FLE books used to have more extensive ones as well[8]. In terms of sources, it can be noticed that while FLE textbooks give students access to the entirety of their resources, audio tracks and additional external supports for EFL are meant for teachers exclusively. Finally, although most inputs in both EFL and FLE are of a linguistic nature, those used in English lessons tend to be non-fictional, while French ones follow the opposite pattern. Concerning output, FLE textbooks maintain a positive balance between speaking and writing, whereas EFL students are predominantly required to write. FLE expression exercises are short, while EFL offers both short and long productions, some of

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[8] According to some authors of FLE textbooks that were interviewed, it seems that the recent trend is to portray French as an 'easy' and fun language by providing shorter and easier texts and audios in the textbooks.

which include external contents (i.e. personal information, research) that do not usually appear in FLE textbooks.

To summarise, EFL and FLE textbooks share some common traits: students are mostly not required to initiate speech, they predominantly use short-term memory for exercises and tasks, and they tend to work individually. Other features, often diametrically opposed, could be considered as characteristic of two distinct genres: EFL textbooks and FLE textbooks (and not 'L2 textbooks' in general). In EFL textbooks, Littlejohn's framework shows that the interest lies within understanding written non-fictional material, while FLE textbooks display a decisive interest in balancing their sources, but the understanding of written contents is not paramount (as will be confirmed through Hyland's framework). Some of the reasons explaining these characteristics will be presented in the Discussion.

The linguistic analysis provided outcomes of a different nature compared to the didactic ones. First, even when presented with the same theme, we are faced with significantly different interpretations. On the subject of 'food', FLE textbooks opt for a common framework: the lessons revolve around gastronomy, cooking, food culture in general, as one would find in most European L2 textbooks. EFL textbooks show the topic through a different lens: food and food culture function as a means to introduce a number of subjects (e.g.: agriculture, technology, social issues), giving the 'theme' a wider meaning.

By comparing the linguistic markers found through Hyland's edited framework (as in Figure 6), EFL textbooks would appear to favour an author-oriented discourse (presenting higher occurrences of stance) to the reader-oriented one seen in FLE publishing (richer in engagement occurrences).
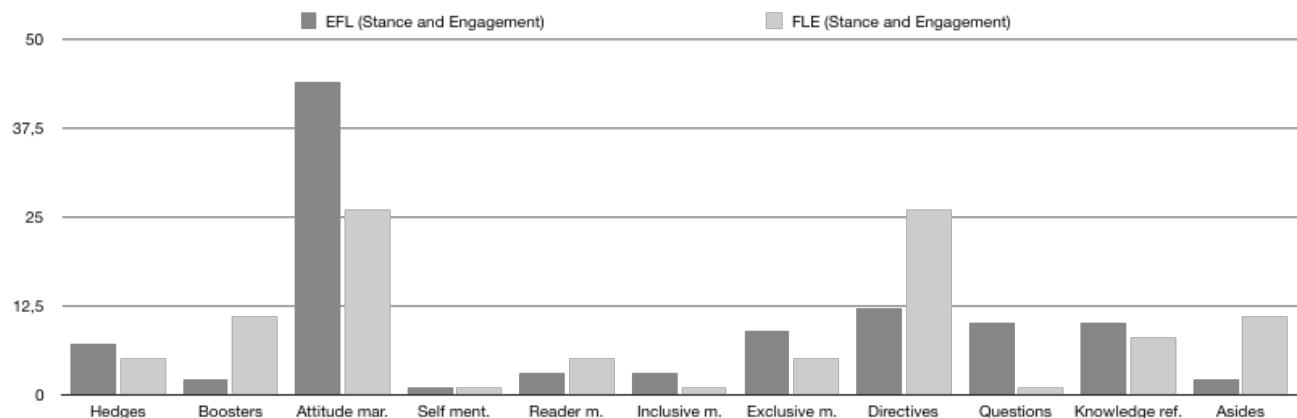
Figure 6. *Graphic comparison of linguistic markers in EFL and FLE textbooks*

In terms of *stance*, a different 'voice' is shown: EFL textbooks display more hedges (e.g. inverted commas, epistemic modality) than FLE ones. On the other hand, boosters can be perceived as preponderant in FLE publishing and as almost non-existent in EFL, resulting in a more cautious voice in English, opposed by an enthusiastic – sometimes very direct – voice in French.

Attitude markers are extremely frequent in both EFL and FLE, but the former has almost twice as many occurrences as the latter and of a more diversified nature. The main results to be drawn from the analysis of attitude markers are that most markers can be described as *axiological* (expressing either judgment or appreciation), with most of them being connected with the term "good" (whether it be in English, French or Japanese). Figure 7 delineates some examples of the findings for each category, organised by absolute frequency.

Category		Example	Reference
Affective	(1)	Oui, j'**aime** beaucoup le chocolat *[Yes, I really **love** chocolate]*	MJE, 39
	(2)	- Olivier, il y a du fromage. - Humm… j'**aime** le fromage ! *[- Olivier, we have cheese.* *- Mm… I **love** cheese!]*	ALD, 19
	(3)	- Qu'est ce que vous **aimez** comme boisson ? - J'**adore** la bière. *[- What kind of drink do you **like**?* *- I **love** beer.]*	ES1, 56
Axiological	(4)	Mochiron, **oishii** osake no aru tokoro ni wa, **oishii** tabemono ga aru *[Of course, where there is **good** alcohol there is **good** food]*	A&K, 39
	(5)	Au Maroc [...] on peut manger du **bon** couscous *[In Morocco [...] we can eat a **good** couscous]*	DFR, 26
	(6)	… celebrating important events with **good** food	MW1, 74
	(7)	… people carefully choose seasonal ingredients of the **local** area	MW1, 76
	(8)	Traditionally, Japanese farmers have grown products unique to their **local** area, and have offered the delights of the season to the **local** consumers	NOW, 142
	(9)	C'est un peu lourd, mais **délicieux** *[It is a bit heavy, but **delicious**]*	ES2, 2
	(10)	Il faut l'essayer [le couscous] ; c'est vraiment **délicieux** ! *[You must try [the couscous]; it is really **delicious**!]*	DFR, 32
Non-axiological	(11)	**New** challenges for uniqueness…	NOW, 142
	(12)	… breed a **new** variety…	UNI, 108
	(13)	Their lives were not **easy**…	CR1, 63
	(14)	Stopping drinking is not **easy**…	CR1, 63

***Figure 7**. Some examples from the attitude marker analysis*

Of course, appraisal markers tend to cluster (Hunston, 2011: 16), as we can see in examples 1 (the adverb *beaucoup*, "a lot", strengthening the verb), 4 (where the adverb *mochiron*, "of course", hints to a *doxa*), and 6 (where "good food" is associated with the celebration of important events). Although the frequency of a single word might not be statistically relevant, the repetition of synonyms and the association of different linguistic items all tend to point in the same direction: adding value to food culture and gastronomy. In FLE publishing, most attitude markers are related to the notions of liking (more rarely of disliking) something, arguably because of didactic needs (learning to express what one likes/dislikes being one of

the objectives of beginner levels). In EFL textbooks, the characteristics are more varied, as the authors talk about fresh and local ingredients, traditional cooking, food as a means to celebrate and spend time with the family, without omitting potentially negative notions such as danger.

As far as mentions are concerned, a certain amount of *inclusive* mentions can be found in EFL publishing (albeit they are almost completely absent in FLE), either on a general tone as in "***We** have another story from which **we** can draw a moral*" [UNI, 108], or explicitly referring to the authors' and readers' nationality: "*Japan is a rich country. **We are the third largest economy in the world***" [CR1, 71]. Exclusive references are twice as frequent as inclusive ones, but they tend to differ depending on the language: in EFL, they are often related to authorities, such as "*The **government** reports that…*" [CR1, 65], or deliver what is perceived as a common opinion, as in "***Some people** regard these changes as good*" [MW1, 78]. The opinion or piece of information expressed by said external characters assumes great importance in the EFL corpus, while exclusive mentions in FLE textbooks are related to characters whose sentences hold little to no value (with no inquiry about the meaning of their sentences, the focus being solely on the linguistic form).

With respect to *engagement* markers, many differences can be found. First of all, FLE textbooks tend to feature more directives than EFL, albeit of a less diverse nature, which can also be linked to the 'stronger' voice found when investigating stance markers. Indeed, EFL contents show suggestions such as "*washoku **should** be preserved for future generations*" [MW1, 80], while FLE directives are limited to instructions to perform tasks or do exercises. Another distinction concerns questions: almost non-existent in FLE textbooks (exercises' instructions included) but usually employed in EFL to anticipate the content of a text, as well as to check comprehension. The use of knowledge references is also substantially different: the main references seen in FLE books could be deemed stereotypical or cliché. Conversely, EFL

supports tend to convey or imply that authors and readers actually belong to the same linguistic, social and cultural group[9], reinforcing the 'we' that was created through other linguistic devices. Lastly, asides are very common in FLE and relatively rare in EFL textbooks. As previously stated, French textbooks appear to be more reader-oriented, as is confirmed by the presence of side notes, warnings, translations and comments that the authors provide to help readers in the learning process.

5. Discussion

While examining the didactic features of the textbooks through Littlejohn's framework, the most salient features showed a trend in EFL textbooks to expect students to work individually (without initiating speech) on the understanding of written non-fictional material. On the other side, FLE textbooks provided a better balance of inputs and outputs, although the latter were more guided than in EFL and mostly focused on language activities (with meaning never at the core of the exercises).

The linguistic analysis provided information of a different nature, showing divergences in the author-reader relationships in terms of 'voice' and 'independence'. Indeed, linguistic marks of stance show a confident voice in FLE textbooks, while EFL ones tend to present assertions in a more cautious way. However, the latter also show a larger variety of appreciation markers, encompassing positive and negative occurrences as well. While this finding might appear anecdotal, given that in the 'food/gastronomy' units it usually regards the dangers of

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[9] For instance, FLE textbooks would talk about very expensive restaurants or products (such as wine) as if they were well-known by everyone, reinforcing the image the reader is possibly expecting from French gastronomy: it is delicious and expensive. In EFL textbooks, the authors can talk about recent society phenomena without explaining them, assuming that the reader knows what they are talking about and strengthening their relationship through this mutual understanding.

foreign-imported ingredients or traditions, it shows the tendency of EFL writers of underlining the attractiveness of local food culture while warning the readers about foreign countries in a 'us *vs* them' fashion. The protection of Japanese culture is something that sociologists such as McVeigh explained regarding the Japanese approach to EFL, going as far as to say that in some cases learning English could mean "becoming contaminated by non-Japaneseness" (2004: 215) and be perceived in a negative way. Although the textbooks in question do not point the finger at the English language, foreign (mostly Western) countries are sometimes linguistically linked to the notion of danger, implying that what is threatened (Japan and its culture) has a high value and stressing the polarisation us/them.

In terms of independence, FLE textbooks supply learners with all the materials (as shown in Littlejohn), guiding them through a rich apparatus of asides, notes, suggestions and metalanguage that would help studying autonomously. In EFL teaching, the students would have to rely more on the teachers (who in turn rely on the textbooks and the numerous supports provided by the publishing companies to guide classroom activities).

Combining the results from both frameworks, it is possible to perceive different expectations about the students: EFL ones are required to deeply understand long messages about social issues and draw links with their own society and culture, thus projecting themselves as future citizens. In that sense, learning English is yet another way to form a young person and guide them to adulthood, as other school subjects do. On the contrary, FLE textbooks do not focus at all on understanding messages or meaning, enclosing the students in a fictional universe and with situations mostly related to tourism (in addition to food, all the other themes seem to point in that direction as well). In that way, learning French grammar and vocabulary (the main focus of the textbooks) appears to be solely a means to surviving as a tourist in a French-speaking country. This claim can be supported by the results related to the

engagement category, with EFL authors creating inclusiveness and making their readers feel part of the same community, with similar goals and aspirations on a social level. Conversely, FLE authors appear to be more detached from the students; the contents of the textbooks are also less varied and sometimes superficial or cliché, and the engagement with the students is mostly that of a guide, a teacher (opposite to a fellow citizen in EFL textbooks).

The contrast between the two languages' purposes would be heightened in those learners who are being exposed to both models at once (e.g. in high schools), possibly influencing their perception of the language as more or less 'useful' or 'serious' and thus their motivation in learning it.

Since EFL textbooks need to be approved by MEXT, they usually adhere to laws on education and ministerial directives. For example, one of the objectives of education of the Basic Act on Education clearly states:

> (5)   fostering the value of respect for tradition and culture and love of the country and regions that have nurtured us, as well as the value of respect for other countries and the desire to contribute to world peace and the development of the international community. (MEXT, 2006)

Similar inputs can be observed throughout the EFL teaching materials, where a specific theme can be approached in a variety of ways. In this case, the theme of 'food' was examined. In FLE textbooks, not bound to follow MEXT's guidelines, this subject is almost exclusively epitomised by lists of French meals. On the other hand, authors of EFL publishing seem to follow a pattern where Japan is first introduced along with its traditions and merits; only at a subsequent time is it compared or accompanied by foreign food culture, often to warn students about it through negative attitude markers and epistemic modalities to plant seeds of doubt (for

instance, by suggesting that "*what you eat **may** come from foreign countries*" [MW1, 78] in a larger co-text implying uncertainty and danger that oppose a higher quality of national food and ingredients). I argue that this trend could constitute a way of interpreting guidelines from the ministry, especially - here - to the "respect for tradition and culture and love of the country". Drawing from the results of this first comprehensive analysis, a second study was conducted to dig deeper into the intertextual relationships between EFL textbooks and Japanese laws on education (Ronci, 2020).

6. Conclusion

The analysis of 'food/gastronomy' lessons in both EFL and FLE textbooks currently used in Japanese high schools hints at a different purpose at the very core of the teachings at issue, with English supports being a means to the development of future citizens and FLE texts being almost completely detached from the students' lives and culture. Differences in the author's 'voice' and learners' autonomy emerged as well. Following the leads that this article hints to, deeper research on the intertextual links between the corpus and previous (or contemporary) discourse on foreign language education would undoubtedly provide an even more accurate and sensible definition of L2 teaching in Japan.

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Appendix 1

Linguistic framework: *stance* (S), *mention* (M) and *engagement* (E) categories.
In Hyland's framework, *mentions* are not separated from the others: self mentions are included in *stance* and reader mentions in *engagement*. Inclusive and exclusive mentions do not appear in his work.

		Hyland (2008)		In this study (adaptations of Hyland and additions from Kerbrat-Orecchioni for attitude markers)		
	Category	Definition	Examples	Definition		Examples
S	Hedges	Devices which withhold complete commitment to a proposition, implying that a claim is based on the writer's plausible reasoning rather than certain knowledge.	- several <u>possible</u> reasons - <u>may</u> - there is <u>a tendency</u> to… - <u>could</u>	Markers of epistemic modality providing any kind of attenuation, less commitment to the proposition or some distance with part of it.		- My work is my "vote<u>"</u> - You <u>may</u> associate... - <u>Approximately</u> 2.3 million people
	Boosters	Markers that allow writers to express certainty in what they say and to mark involvement with the topic and solidarity with readers.	- <u>definitely</u> - <u>sure</u> - <u>prove</u> - <u>obviously</u>	Markers of epistemic modality stressing the certainty of the proposition or intensifying parts of it, sometimes even displaying a sense of surprise. Italics were also considered as boosters here.		- I <u>really</u> enjoyed all the food here - is being sold for <u>as much as</u> 50 Hong Kong dollars<u>!</u> - products will <u>certainly</u> be… - 使える<u>よ</u> - dependence on <u>*one kind*</u> of potato.
	Attitude markers (Hyland)	Markers that indicate the writer's affective, rather than epistemic, attitude to propositions, conveying surprise, agreement, importance, frustration.	"I find it <u>remarkable</u> that even as <u>proficient</u>…" "<u>unexpected, subtle and self-evaluative</u>"	Affective	Relating to emotions on a large scale	"<u>lovely</u>", "<u>scary</u>" - Humm… j'<u>aime</u> le fromage !
				Axiological	Evaluative markers showing judgment or appreciation	"<u>good</u>", "<u>bad</u>" - Au Maroc […] on peut manger du <u>bon</u> couscous - C'est un peu lourd, mais <u>délicieux</u>
				Non-axiological	Evaluative markers whose meaning depend on the speaker's point of view	"<u>long</u>", "<u>short</u>" - <u>New</u> challenges for uniqueness - Their lives were not <u>easy</u>
M	Self mention	The use of first person pronouns and possessive adjectives.	"This paper describes <u>our</u> attempt to…"	The use of first person pronouns and possessive adjectives related to the author (and not to fictional characters speaking with first person pronouns) or verbal forms expressing the presence of the author (in Japanese).		*VERY RARE* - Today, <u>I</u> will show you how to make… - 堪能してみ<u>たい</u> - <u>ここ</u>はマスタードの本場なのだ (deixis with psychological or affective value of proximity)
	Inclusive mention			Mentions that allow authors to create a 'we' expressing 'I + You' (often with a 'we = the Japanese' meaning, sometimes with a larger one, 'we = human beings').		- <u>We</u> mean well, but <u>we</u> sometimes send the message… - Japan is a rich country. <u>We</u> are the third largest economy...

	Exclusive mention			Mentions that exclude both the author and the reader, a "them" representing an out-group, sometimes an authority.	- The government reports that… - all the experts agreed that… - from a homeless person's point of view
	Reader mention	Reader pronouns. However, *you* and *your* are rare in academic writing. Instead, there is enormous emphasis on binding participants together through the use of inclusive *we*.	"What we found interesting about this context…"	Second person pronouns and adjectives, as well as direct mentions of "students" and "classmates".	- Today, I will show you how to make… - Which food in the dishes above do you like the best? - あなたの意見を発表してみましょう
E	Directives	Markers that serve the purpose of guiding the reader towards other texts, giving instructions on physical actions and suggesting the correct interpretation of what has been stated.	"(see Smith 1999, refer to table 2)" "open the valve" "note [some argument]"	In foreign language textbooks, quotes and references are quite rare, so the *directives* category encompasses exercises' instructions, suggestions, and injunctions expressed in the corpus.	- Let's listen to the dialog. Let's write about it. - Complete by filling in the blanks - washoku should be preserved for… - Now the moral we should draw…
	Questions	The main strategy of dialogic involvement. Mostly rhetorical, presenting an opinion as interrogative.	"Why did protests center in some shantytowns, but not others?"	The presence or lack of any kind of questions was scrutinised. Then, we focused on questions displaying implications or *doxa*.	- Do people in France celebrate important events with good food? - What is the danger of only growing genetically identical plants? - What sort of volunteer work do you do, or would you like to do?
	Knowledge reference	Explicit signals asking readers to recognise something as familiar or accepted and in so doing construct readers by assigning to them a role in creating the argument, acknowledging their contribution while moving the focus of the discourse away from the writer to shape the role of the reader.	"well known", "obviously"	Any marker displaying a relationship between the author and the reader in terms of shared knowledge, consensual ideas, *doxa* and implications. Markers such as those in Hyland's examples were classified in the *boosters* category.	- When the economy went down, [many day laborers] could not find jobs. ← reference to *the lost decade* - various kinds of farmers markets such as those at Michi-no-Eki. - By eating *osechi* dishes together, people make family ties stronger.
	Asides	Device that allow writers to address readers directly by briefly interrupting the argument to offer a comment on what has been said.	"And - as I believe many TESOL professionals will readily acknowledge - critical thinking has now…"	The *asides* that are frequent in academic writing usually appear in different ways in textbooks, i.e. footers, tables and other elements that are, literally, on the side of the main text. These elements were classified in this category.	Footnotes: - get of the streets ≒ stop being homeless - N..B. 否定文では,直接補語の前につく部分冠詞は de に変わる - ⑦ 発音注意！*nous faisons*［ヌ フ ゾン］ - Bon appétit！たっぷり召し上がれ。(食事をする人に言うあいさつ)

Appendix 2

Results from the didactic analysis of lessons related to 'food/gastronomy' in the corpus, using Littlejohn's framework (2011). This appendix provides quantitative data[10] for each category.

I. What is the learner expected to do?

A. TURN TAKE	EFL TOT	FLE TOT	A. TURN TAKE
Initiate	12	4	Initiate
Scripted response	9	**26,5**	**Scripted response**
Not required	**92**	**30,5**	**Not required**

B. FOCUS	EFL TOT	FLE TOT	B. FOCUS
Language system (rules or form)	21	**30**	**Language system (rules or form)**
Meaning	**57**	6	Meaning
Meaning/system/form relationship	31	**21**	**Meaning/system/form relationship**

C. MENTAL OPERATION	EFL TOT	FLE TOT	C. MENTAL OPERATION
Repeat identically	2	**12,5**	**Repeat identically**
Repeat selectively	0	3	Repeat selectively
Repeat with substitutions	7	**14**	**Repeat with substitutions**
Repeat with transformations	**14**	5	Repeat with transformations
Repeat with expansion	1	1	Repeat with expansion
Retrieve from STM/working memory	**61**	**24**	**Retrieve from STM/working memory**
Retrieve from LTM	**21**	5	Retrieve from LTM
Formulate items into larger unit	3	3	Formulate items into larger unit
Decode semantic/propositional meaning	12	**13**	**Decode semantic/propositional meaning**
Select information	**50**	**17**	**Select information**
Calculate	0	0	Calculate
Categorise selected information	5,5	2	Categorise selected information
Hypothesise	4	3	Hypothesise
Compare samples of language	2	1	Compare samples of language
Analyse language form	0	4,5	Analyse language form
Formulate language rule	0	2	Formulate language rule
Apply stated language rule	**37**	**24**	**Apply stated language rule**
Apply general knowledge	15,5	4	Apply general knowledge
Negotiate	3	0	Negotiate
Review own FL output	0	0	Review own FL output
Attend to example/explanation	0	6	Attend to example/explanation
Research	0,5	0	Research
Express own ideas/information	**18**	6	Express own ideas/information
Translate	**12**	5	Translate
Learn by heart	2	3	Learn by heart
Dictation	0	5	Dictation

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[10] Whenever the exercises' instructions were not explicit enough to understand *how* the students were meant to do the activity, leaving room to multiple interpretations, the possibilities were marked with ' / ' (0,5) instead of ' X ' (1) in the quantitative tables.

II. Who with?

	EFL	FLE	
	TOT	**TOT**	
Teacher and learner(s), whole class observing	5	1	Teacher and learner(s), whole class observing
Learner(s) to the whole class	**22**	2	Learner(s) to the whole class
Learners with whole class simultaneously	2	**14**	**Learners with whole class simultaneously**
Learners individually simultaneously	**92**	**30**	**Learners individually simultaneously**
Learners in pairs/groups; class observing	5	**0**	Learners in pairs/groups; class observing
Learners in pairs/groups; simultaneously	**12,5**	**14**	**Learners in pairs/groups; simultaneously**
Learner individually outside the class	5,5	2	Learner individually outside the class

III. With what content?
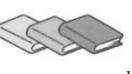
	EFL	FLE	
A. INPUT TO LEARNERS	**TOT**	**TOT**	**A. INPUT TO LEARNERS**
Form			Form
Graphic	6	**20**	**Graphic**
Words/phrases/sentences: written	**87**	**50**	**Words/phrases/sentences: written**
Words/phrases/sentences: oral	**19**	**36**	**Words/phrases/sentences: oral**
Extended discourse: written	**33**	1	Extended discourse: written
Extended discourse: oral	0,5	0	Extended discourse: oral
Source			Source
Materials	**104**	**57**	**Materials**
Teacher	16	5	Teacher
Learner(s)	0	0	Learner(s)
Outside the course/lesson	0,5	0	Outside the course/lesson
Nature			Nature
Metalinguistic comment	5	**13**	**Metalinguistic comment**
Linguistic items	**74**	**55**	**Linguistic items**
Non-fiction	**51**	4	Non-fiction
Fiction	**25**	**18**	**Fiction**
Personal information/opinion	0	0	Personal information/opinion
Song/Clip	0	0	Song/Clip

	EFL	FLE	
B. OUTPUT FROM LEARNERS	**TOT**	**TOT**	**B. OUTPUT FROM LEARNERS**
Form			Form
Graphic	7	3	Graphic
Words/phrases/sentences: written	**79,5**	**31**	**Words/phrases/sentences: written**
Words/phrases/sentences: oral	**32,5**	**28,5**	**Words/phrases/sentences: oral**
Extended discourse: written	4	0	Extended discourse: written
Extended discourse: oral	2	0	Extended discourse: oral
Source			Source
Materials	**105**	**55,5**	**Materials**
Teacher	1	0	Teacher
Learner(s)	13,5	5	Learner(s)
Outside the course/lesson	3	0	Outside the course/lesson
Nature			Nature
Metalinguistic comment	3	4	Metalinguistic comment
Linguistic items	**67**	**52,5**	**Linguistic items**
Non-fiction	**52**	5	Non-fiction
Fiction	**19**	**12**	**Fiction**
Personal information/opinion	**17,5**	6,5	Personal information/opinion
Song/Clip	0	0	Song/Clip

Appendix 3

In his article, Littlejohn (2011) provides a definition and an example for each of the mental operations required from the tasks in the analysis. In this appendix, we added an example from our corpus for each category (all rights reserved to original owners). Please, keep in mind that each task can require more than one operation simultaneously.

MENTAL OPERATION	EXAMPLE FROM THE CORPUS
1. Repeat identically	単語を確認しながらオーディオトラックを聴き、声に出して繰り返しましょう。 Lisez en écoutant les pistes audio. Répétez. *Read while listening to the audio tracks. Repeat.* [MJE, 36]
2. Repeat selectively	右の例にならって、クラスメイトと会話ドリルをしましょう。まず、単語リストAとBの単語を1つずつ使って「tu」で練習してください。次は「vous」で練習してみましょう。 Pratiquez à l'oral avec un camarade. Parcourez systématiquement les boîtes de vocabulaire A et B en vous tutoyant, puis recommencez en vous vouvoyant. ① Est-ce que tu manges du pain le matin ? ② Oui, je mange du pain. ② Est-ce que tu manges du pain le matin ? ① Non, je ne mange pas de pain. ① Est-ce que tu manges un sandwich le matin ? ② Oui, je mange un sandwich. ② Est-ce que tu manges un sandwich le matin ? ① Non, je ne mange pas de sandwich. *Practice orally with a classmate. Systematically go through vocabulary boxes A and B (first using 'tu', then 'vous').* [MJE, 37]
3. Repeat with substitutions	DIALOGUE 3 Tu connais la cuisine asiatique ? Oui, j'adore, surtout la cuisine coréenne. C'est très bon. Et toi ? Quelle cuisine est-ce que tu aimes ? la cuisine — française / japonaise / coréenne chinoise / italienne / espagnole / mexicaine indienne / vietnamienne / africaine Activité 3 — dialogue 3 にならって、好きな料理について話しましょう。 Demandez à votre camarade ce qu'il / elle aime comme cuisine en vous référant au dialogue 3. *Ask your classmate what kind of food they like, referring to dialogue 3.* [ES1, 57]
4. Repeat with transformations	各文を( )内の指示に従って書きかえなさい。 1. Sam can swim the butterfly. (疑問文に) 2. His story can be true. (否定文に) 3. Lisa must see a doctor. (yesterday を付け加えた文に) 4. You must talk to him. (否定文に) *Rewrite every sentence by following the instructions between ( ).* [for instance, 'negative'] [VQ1, 37]
5. Repeat with expansion	Let's TRY! あなた自身について発表してみましょう。 ● I will be *eating lunch* this time tomorrow. ● I will be *staying with my grandparents* this time next month. ● I will be *studying English harder* this time next year.

	Try using these expressions to talk about yourself! [NOW, 141]
6. Retrieve from STM/working memory	See example n.3: the vocabulary is immediately accessible to the learners, they just have to "recall items within a matter of seconds" (Littlejohn).
7. Retrieve from LTM	[CR1, 73] Translation exercises usually require recalling linguistic items and vocabulary from a "time previous to the current lesson" (Littlejohn). For example, the first sentence here should be translated as "I saw not only children, but also elderly people laughing out loud". The language structure "not only ~ but also" was explained in the same lesson (7 pages before this one) and the text mentioned children and old people; however, there is no mention of "laughing" in the text, meaning the students should retrieve that vocabulary item from their LTM.
8. Formulate items into larger unit	[UNI, 113]
9. Decode semantic/propositional meaning	 *Listen to the English sentences and mark if they match the content of the text (1, 2) and the illustration (3) with ○ if they do and X if they don't.* [PAS, 30]
10. Select information	 Answer the questions about the text above. [MW1, 76]
11. Calculate	No examples were found in the lessons about 'food/gastronomy'.
12. Categorise selected information	 *Listen carefully to the French sentences and then choose the appropriate drawing.* [NAV, 23]

13. Hypothesise	**LESSON** **Collect Everything.** **Save Everything.** by Susan Dworkin 1. What is the danger of only growing genetically identical plants? 2. What is the Svalbard seed project in Norway? [UNI, 108]
14. Compare samples of language	**Enrich Your Vocabulary** （ ）内に適切な語を入れましょう。 1. associate —— association ▶ I always ( ) him with fast cars. ▶ The name Mark has no ( ) for me. 2. awareness —— aware ▶ Are you ( ) of the time? ▶ People should raise their ( ) about AIDS. 3. consumption —— consume ▶ The car ( ) a lot of fuel. ▶ Fuel ( ) has risen dramatically these days. *Enrich Your Vocabulary ｜ Enter the appropriate word between ( )!* [NOW, 144] In this exercise, the comparison of similar sentences allows the learner to better understand the difference between nouns, verbs and adjectives.

15. Analyse language form	**Pour découvrir 1** (05')
	1. 「(〜するのは)好きですか」とたずねる表現に下線を引きなさい.
	「好きだ」を表す動詞の原形はわかりますか.
	2. 「あまり(好きではない)」という表現に〜〜を引きなさい.
	
	To find out more 1 (05')
	    1. Underline the interrogative expressions for "Do you like (doing something)?". Do you know the basic form of the verb "to love"?
	    2. Draw a 〜〜 under the sentences that mean "(I don't like) very much".
	
	[ALD, 18]

16. Formulate language rule	4. どんなときに Merci と言っていますか. 4. *When do we say* merci? [ALD, 19]
17. Apply stated language rule	See example n.4
18. Apply general knowledge	**Anything more to say?** 1. Do you think that it is the job of the government to be sure that everyone has a place to live and enough to eat? 2. If yes, how about people who don't want to work? If no, how should we help people who cannot take care of themselves? 3. What is the role of charity in a rich country? [CR1, 71]
19. Negotiate	See example n.18, question n.2 (the fact that the authors already include opposite points of view could suggest to the students that they need to add hedges to their answers and negotiate their own opinion to anticipate and react to different ones).
20. Review own FL output	In one textbook (Navi.fr), grammar explanations are combined with exercises. Although this combination could lead to students checking their own FL production in a more direct way than with exercises that are separated from the grammar explanation, it was not considered explicit enough to be included in this category.

	No other example was found in the corpus.
21. Attend to example/explanation	音声を聞きながら、例文に目を通しましょう。次に、「Je mange / J'aime...」の構文を学習して、日本語の文をフランス語に訳しましょう。 Lisez les phrases modèles en écoutant la piste audio. Étudiez la structure « Je mange / J'aime… ». Traduisez en français les phrases exemples. Je mange <u>du</u> pain.　パンを食べます。 Je mange <u>un</u> croissant.　クロワッサンを食べます。 J'aime <u>le</u> pain.　パンが好きです。 J'aime <u>les</u> croissants.　クロワッサンが好きです。 部分冠詞　du pain｜Je mange｜un croissant　不定冠詞 定冠詞（一般的な意味）の単数　le pain｜J'aime｜les croissants　定冠詞（一般的な意味）の複数 1　朝はシリアルを食べます。シリアルが好きです。 2　納豆を食べますか？(tuを使って) 3　納豆は好きですか？(tuを使って) *Read the sample sentences while listening to the audio track. Study the structure "Je mange / J'aime…". Translate into French the sample sentences.* [MJE, 38] In most cases, grammar explanation or examples are not preceded by instructions telling the students to read them. Their importance is implied.
22. Research	Use it　あなたの学校の規則を、3つ書いてみよう。 (例) We have to wear school uniforms. We must not use cell phones in school. We cannot bring comic books to school. *Let's try and write three rules for your school!* [VQ1, 37]
23. Express own ideas/information	Activité 1　以下の表現を使って、普段、朝食・昼食・夕食に何を食べるのかお互いに話しましょう。Dites ce que vous mangez habituellement le matin, le midi et le soir. D'habitude, ｜ au petit déjeuner, / au déjeuner, / au dîner, ｜ je ｜ mange _____ / prends _____ / bois _____ *Talk to each other about what you usually eat in the morning, at noon and in the evening by using the expressions above* [Japanese instructions]. *Tell what you usually eat in the morning, at noon and in the evening* [French instructions]. [ES1, 56]
24. Translate	4　日本語に合うように、（　）内の語を並べかえて英文を完成させなさい。総合 1. すぐにジョンに手紙を書くつもりです。 I (letter / to / write / will / a / John) soon. 2. 以前は電話で彼と話をしたものだ。 (to / I / talk / him / with / used) on the phone. 3. 外は暗い。散歩に出掛けてはいけません。 It's dark outside. (had / out / not / go / better / you) for a walk. *Rearrange the words between ( ) to match Japanese and complete the English sentences.* [VQ1, 39]

25. Learn by heart	●買い物リスト 🔊1-13
	□une baguette Ⓕ バゲット □un croissant Ⓜ クロワッサン □une brioche Ⓕ ブリオッシュ □un pain aux raisins Ⓜ レーズンパン □un pain au chocolat Ⓜ チョコレートパン □un sandwich Ⓜ サンドイッチ □un chausson aux pommes Ⓜ リンゴのパイ □une quiche Ⓕ キッシュ □une tarte Ⓕ タルト □un millefeuille Ⓜ ミルフィーユ □un éclair Ⓜ エクレア □un macaron Ⓜ マカロン
	Shopping list. [NAV, 21] In this example, the instruction 'learn by heart' is implicit, but the students will need the vocabulary in this box for the following exercises, so we could assume that its presence would lead to some kind of repetition and learning.
26. Dictation	2. CD を聞いて書きとり，言えるようにしてきなさい． 🔊7 1) —( ) bien ? 2) —( ). Et vous ? — Oui, merci. — Je m'appelle (自分の名前). *2. Listen to the CD and write down what is said, then go ahead and say it [read it out loud]*. [ALD, 11]

Visuospatial Working Memory of Serial Order in Humans and Chimpanzees:
The Possible Influence of Language on Recall

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Abstract

In recent years, most researchers have been interested in unravelling cognition which is perhaps the most challenging undertaking by humans to date; but studying our nonhuman counterparts may have made it easier especially in terms of working memory (WM) functions in relation to language. The present paper aims to investigate the possible influence of language as verbal coding on the recall of serial order in visuospatial working memory (VSWM) in humans compared to chimpanzees in previous research. Such was investigated in 4 experimental masking tasks: 2 verbal Arabic numerals tasks and 2 nonverbal symbols tasks. Both numerals and symbols tasks utilized a dual-task paradigm of an 8-digit sequence as verbal interference (VI) to investigate the influence of language as manifest in verbal coding. For all experiments, there were variations in latency times for which characters were shown before masked. Findings revealed that a) chimpanzees clearly outperform humans in the Arabic numerals task; b) human capacity is limited but is dependent on latency time, and c) language as manifested in verbal coding does have an influence but such is dependent on the mode of presentation of serial order. Finally, limitations in methodology are discussed followed by implications especially those pertaining to bilingual studies.

Keywords: visuospatial, working memory, chimpanzees, serial order, trade-off

1. Introduction

The ability to encode, process, and recall information is considered as an essential cognitive ability, be it in humans or nonhumans. When it comes to working memory (WM), several studies have been carried out that mostly involved the phonological loop or verbal working memory (VWM) – a WM subcomponent. However, fewer studies[11] have focused on the visuospatial WM (VSWM) (Baddeley, 2007) especially how verbal interference (VI) per se might influence the processing of sequentially presented spatial locations with most studies focusing on the visual component of WM (e.g. Larsen & Baddeley, 2003; Logi & Marchetti, 1991; Logie, Saito, Morita, Varma, & Norris, 2016) or the verbal (e.g. Jones, Macken, & Nicholls, 2004; Jones, Hughes, & Macken, 2006; Nelson, Brooks, & Borden, 1973) with less focus on the spatial (e.g. Bouma, 1987; Chuah & Maybery, 1999; Depoorter & Vandierendonck, 2009; Jalbert, Saint-Aubin, & Tremblay, 2008; Dent & Smyth, 2005). So, the question remains then as to how does VI influence spatial recall of serial order?

1.1 Visuospatial working memory of humans

VSWM is a subcomponent of WM and it is thought to be responsible for the manipulation of visual and spatial information ones (for a full review of the WM multicomponent model see Baddeley, 1986, 2007; Cornoldi & Vecchi, 2003; Logie, 1995). When it comes to combining the study of Baddeley's (2007) WM components and serial order, several theories have risen (See Baddeley, 2007 for an extensive review). An example of which is the associative theory which claims that we store information by making associations between the beginning and the

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[11] Most studies focused on which type of interference (verbal, spatial, or visual) influences recall of visuospatial information the most (e.g. Deyzac, Logie, & Denis, 2006; Postle, D'Esposito, & Corkin, 2005; Zhao, Chen, & West, 2010; Zimmer, Speiser, & Seidler, 2003).

end of a sequence (see Shiffrin & Cook, 1978). It was further explained through the primacy model by Page and Norris (1998) where items recalled sequentially are always associated with the first item but with decreasing strength hence errors in recall arise due to decay, but this may be reactivated through rehearsal. In other words, recall of serial order according to this model is supposed to be enhanced by verbal rehearsal. Furthermore, any potential interference makes these items vulnerable to trace decay. Accordingly, verbal interference is likely to negatively influence recall of serial order especially when it is phonologically similar to the recalled items (Baddeley, 2007, Baddeley, Eysenck, & Anderson, 2015; Logie, 1995).

Based on these serial order theories, it would be interesting to investigate if they also apply for VSWM serial recall as influenced by verbal rehearsal mechanisms and this is because most previous research has focused on tasks involving one WM subsystem, but few studies have explored the possible interface between VWM and VSWM in serial order processing. One way to explore this would be through a dual-task paradigm where subjects perform a primary memory task and a secondary memory task simultaneously. If the two tasks utilize the same limited cognitive resources, then a dual-task methodology will show weaker performance on the primary task than when this task is performed separately. Previous researchers have utilized this framework using verbal interference such as articulatory suppression (e.g. verbal repetition of digit sequence) as the secondary task while engaged in a primary memory task. Of interest for the present study are tasks that involve remembering "where" and remembering "what". For instance, several studies found no significant effects of retaining a visual pattern when encoding and recalling a digit sequence at the same time (Cocchini et al., 2002) nor for spatial patterns in a syntactic category task (Postle, D'esposito, Corkin, 2005). This could be interpreted as the possible separability of operations of the VSWM and the VWM at least for the tasks provided. However, a more positive correlation between the two systems was found

where engagement in a verbal reasoning task concurrently with serial digit recall showed a disruption in performance on both tasks when processing became increasingly difficult (e.g. Baddeley et al., 1984; Posner & Konick, 1966). This finding could signal the presence of rehearsal that was disrupted by digit recall i.e. rehearsal is necessary for serial order[12].

Nonetheless, Nelson et al. (1973) found that in several variations of a word to picture trials, subjects performed better in picture-picture trials where verbal codes might be less present than in a word task. The absence of a verbal code has perhaps improved recall of the serial order. The authors explained this in terms of the nonverbal system being capable of coding sequential information as well as the verbal one. But a cognitive trade-off hypothesis may be a plausible explanation where a supposed negative influence or pressure from language might be impeding recall for serial order.

Despite the supposed negative influence of language on recall for serial order, most research on WM viewed language more positively. For instance, in investigating limitations in capacity, researchers varied between verbal and nonverbal stimuli based on the assumption that verbal rehearsal is beneficial for recall. Several studies on information coding revealed that our STM might be limited in how many features we can remember for items (Baddeley, 2007; Cowan, 2010) and retention of such information may be influenced by verbal rehearsal. For example, it has been shown that one can remember quite easily both the colour and shape of a

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[12] Such importance of the verbal system for visuospatial serial order has been shown in several studies. For instance, in a series of experiments Nelson et al. (1973) have shown that learning the serial order of pictures involves the verbal system where subjects reported using verbal codes to help recall the serial order of the pictures. The authors explained this in light of Paivio's (1971) dual coding hypothesis. According to Paivio, there are 2 independent processing systems: one specialized for imaginal information and the other for coding verbal information. The visual system is reserved for coding simultaneously presented information while the verbal is involved in coding sequential or serial information (Paivio, 2014). As such, according to Paivio's hypothesis, verbal coding is supposed to aid in recall.

letter after it has been briefly presented then masked by an asterisk (e.g. Irwin & Andrews, 1996). Nonetheless, such finding cannot completely rule out the influence of verbal rehearsal because letters can be verbally coded. Hence there was a need to use abstract symbols that are not easily recalled through verbal rehearsal in any similar study and research saw the use of more nonverbal stimuli such as wallpaper patterns (e.g. Broadbent & Broadbent, 1981), faces (e.g. Smyth et al., 2005), and bars (e.g. Luck & Vogel, 1997; Corsi, 1972). The use of these abstract stimuli, however, does not completely rule out the absence of verbal coding (Logie et al., 2000). It seems logical then that occupying the phonological loop is needed to test if an increase in capacity would occur, but findings suggest even in the presence of articulatory suppression and rapid presentation of characters, no changes in performance occur at least for object memory (e.g. Vogel, Woodman, & Luck, 2001). But, will the same pattern emerge for spatial memory in recall of serial order? The present study aims to investigate this by bringing together memory for what (visual STM), memory for where (spatial STM), and a possible how (verbal STM).

The investigation of serial order is not unique to humans, but it further extends to the field of comparative psychology. Numerous studies have been done on humans and nonhumans alike to better understand the underlying mechanisms associated with WM and the encoding of serial order (see Smith & Beran, 2017 for a review). The studies on nonhuman intelligence are particularly significant because they have offered us direct information on what cognitive processes are like in the absence of spoken language and aspects of our own cognition that are dependent on or influenced by language (Fagot & Barbet, 2006; Wasserman & Zentall, 2006).

1.2 A chimp's cognition: extending the frontiers to human intelligence

Comparative studies of cognition that are of concern to us are those pertaining to our supposed ancestors: apes. Stemming from Darwin's Evolution Theory, and based on other research, humans and chimpanzees appear to share some kind of kinship as revealed by their genetic makeup (Seyfarth, Cheney, & Bergman, 2005; Tomasello & Herrmann, 2010; Wasserman & Zentall, 2006). Chimpanzees, for instance, were found capable of finding hidden objects as well as human children (Tomasello & Call (1997) but their spatial retention decays with time (most likely faster than in humans) perhaps because chimpanzees live in the here and now and do not need to recall the past (Matsuzawa, 2012; Tomasello & Herrmann, 2010). But questions remained regarding their faster and more accurate performance than humans, and to further understand such species difference in visuospatial retention, eye-tracking studies have been carried out on children and chimpanzees (See Kano & Tomonaga, 2009, 2011). The difference in the timing of eye movement was attributed to ongoing cognitive processes (e.g. Findlay & Walker, 1999) where humans engage in prolonged fixations in semantically demanding activities such as reading (Clifton et al., 2016; Kano & Tomonaga, 2011) which therefore limits our amount of scanning of the visual field. In other words, chimpanzees may be faster in their scanning than humans because, to the best of our knowledge, they do not have such semantic processing as revealed by studies on both species (Dent & Smyth, 2005; Ginsburg, Archambeau, van Dijck, Chetail, & Gevers, 2017; Inoue & Matsuzawa, 2009; Matsuzawa, 2009; Washburn, Gulledge, James, & Rumbaugh, 2007). Such a lack of semantic processing in chimpanzees might be rather advantageous for WM functions.

1.3 Visuospatial working memory of chimpanzees

As explained thus far, the representation of language in chimpanzees is thought to mirror the representation of language in humans especially in terms of working memory. Several studies have shown that apes tend to engage in internal cognitive processes much like humans when it

comes to reconstructing old and novel patterns (Vauclair, 1994). Such ability was also extended to numerical skills as shown by Boysen and Berntson (1989). To explain how a chimpanzee develops numerical skills, and whether this is representative of the development seen in humans, Boysen & Berntson theorized that chimpanzees possess the capacity to engage in ordering numerical skills and not only subitizing them i.e. they can both recognize numbers and count them ordinally and cardinally[13]. The chimpanzees in their study were able to count novel objects using the Arabic numerals and both their performance and development reflected that observed in human children's numerical skills. In other words, the chimpanzees showed aspects of not only recognition memory but also reproductive one (e.g. Vauclair, 1994). Based on these findings, it was suggested that more research was required on studying the capacity for numerical competence in chimpanzees as it can tell us about the cognitive structure in apes, humans' phylogenetic origins and cognitive evolution, and the ontogeny of number concepts in children (Boysen & Berntson, 1989; Fagot & Barbet, 2006).

1.4 The Cognitive Trade-Off hypothesis

One of the most notable researchers to investigate and expand on both numerical competence and reproductive memory in chimpanzees, and whose theory is the foundational argument in this paper, is primatologist Tetsuro Matsuzawa of Kyoto University in Japan. His decades of research on our supposed nonhuman relatives have put forth revolutionary ideas in terms of WM and language through what he terms the Cognitive Trade-off hypothesis, the theoretical basis for the present study. Put simply, Matsuzawa believes that in the process of evolution,

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[13] The chimpanzees were trained on counting food items first then these were replaced by the Arabic numerals on glass placards utilizing the numbers 0-5. Then, they were trained on the order of counting from 0-5 and were no longer limited to recognizing the numbers as individual items.

humans had to sacrifice parts of their cognition to make room for even more complex processes and perhaps the most noteworthy is language (Inoue & Matsuzawa, 2007, 2009; Matsuzawa, 2009, 2012, 2013).

Such trade-off notion came from a series of experiments on well-trained chimpanzees at a semi-natural primate habitat at Kyoto University. Matsuzawa and his colleague Inoue (2009) first discovered the higher WM capacity of chimpanzees in a serial order digit span task of 9 Arabic numerals accuracy (See Inoue & Matsuzawa, 2009 for more on these experiments) which later extended into a limited-hold masking task.

In the masking task, the numerals on the screen were immediately covered with white squares when the subject touched the smallest numeral and their positions were to be recalled from memory. Overall, the response time to responding to the first numeral was longer than the others. This led the researchers to believe that perhaps the chimpanzees analyze the visual scene as one whole before touching the screen i.e. they form a cognitive map of space (Tomasello & Call, 1997). Furthermore, young chimpanzees were found to be faster in their judgement than their adult counterparts. Similar findings are generally reported in studies on humans where children perform better than adults on certain memory tests (See Hayes & Heit, 2004; Sloutsky & Fisher, 2004). Matsuzawa and Inoue attributed such findings to their trade-off understanding wherein the process of acquiring linguistic skills children gradually lose their perceptual photographic memory abilities (or eidetic memory). Such may also be why the young chimpanzees perform better than the adult ones (Inoue & Matsuzawa, 2009).

To better understand the working memory functions of chimpanzees, and better yet humans, Inoue and Matsuzawa (2007) extended their masking task to 9 university students. The students overall performed worse (40% accuracy) than the three young chimpanzees (80%

accuracy). To further investigate such phenomenon, the masking task was used. Performance of humans was compared to that of the best mother performer Ai, and the best young performer, her son, Ayumu (then aged 5.5). Ai's accuracy and that of the human adults declined as the hold duration decreased while Ayumu continued to perform with almost perfect accuracy regardless of the timings. It was speculated that age was a contributing factor to the decline of working memory in both species considering that Ai was, in her prime years, the best in such task just as Ayumu is now. Furthermore, differences in performance between the two were thought to be due to Ai being language trained while Ayumu was not thus aligning with Matsuzawa's hypothesis (Roberts & Quillinan, 2014). As such, while age seems to explain the obvious lapse in memory within-species, it is not enough, however, to explain why chimpanzees are a step ahead than humans in their visuospatial working memory, at least in the task at hand making the trade-off explanation more reasonable. Inoue and Matsuzawa speculate that this trade-off may have exchanged our eidetic memory- which may be the underlying mechanism for extraordinary chimpanzee memory- in favour of language (See section 1.4). Furthermore, such eidetic memory has been shown to be relatively better in children and to decline with age (Giray, Altkin, Vaught, & Roodin, 1976; Haber & Haber, 1988) which might explain why Ai and the adult chimpanzees performed worse than the younger ones.

The above studies give us a glance of why the trade-off notion was coined: to better understand one of the main differences between humans and animals – language. By language here I mean making semantic associations (or symbolic representations) which are thought to impose semantic pressure on our cognition causing us to give up our instant eidetic memory for something more complex and perhaps more essential to us: language (Inoue & Matsuzawa, 2007, 2009; Matsuzawa, 2009). But, is language really the only reason why our immediate

memory is slower than that of these magnificent apes? Of course, any person might argue for the obvious reason: biological makeup owing to species difference. For instance, eye movement may be what influences speed of visuospatial scan, however, such argument is not valid for several reasons. First, several studies have shown that the observed variation in gaze timing is influenced by cognitive processes taking place (e.g. Hollingworth, Richard, & Luck, 2008) and that gaze timing increases as the visual scene becomes more demanding such as in reading (Clifton et al., 2016). Second, the current study does not violate the biological turf of the human body as the lowest speed of 210ms is the least frequency for the human saccadic eye to move from central fixation to peripheral (Bartz, 1962) and such eye movement has been shown to be directed by visual short-term memory (Hollingworth, Richard, & Luck, 2008) and not the reverse. Third, chimpanzees have been discovered to make longer fixations per second than humans when shown several patterns; this might be interpreted as different attentional focus for each species, but some have found that our attentional shifts do not influence visuospatial performance (e.g. Johnson, Hollingworth, & Luck, 2008) suggesting that perhaps each species adheres to certain visual scanning strategies independent of biological makeup (Kano & Tomonaga, 2009, 2011; Myowa-Yamakoshi, Scola, & Hirata, 2012).

Another criticism for semantic pressure came from replication studies. For instance, one study showed that training on the masking task can be a factor (Sielberg & Kearns, 2009), but results revealed that despite training humans could not surpass accuracy for 5 numerals, while Ayumu is reported to have 80% accuracy for 8 numerals unaffected by the limited-hold durations (Matsuzawa, 2009). This suggests that, for the time being, humans cannot outperform a chimpanzees' performance even with training (Matsuzawa, 2013). Such attestation is further highlighted in a recent replication of Inoue & Matsuzawa's study by Roberts & Quillinan (2014)

where despite humans performing better than those in the original study, they still performed significantly worse than Ayumu.[14]

So, the question remains then: what is causing such difference in performance on the VSWM masking task between chimpanzees and humans? Based on the reviewed literature, some have claimed that the competitive nature of chimpanzees and their lack of language interference makes them process a visual field much faster than humans who process everything in a social context i.e. we seem to make meaning out of everything we see (Ginsburg et al., 2017; Matsuzawa, 2013). As such, perhaps what is uniquely ours cognitively – language – may be what is affecting our visual scanning strategies and subsequent perceptual analysis (Kano & Tomonaga, 2009, 2011; Matsuzawa, 2013).

1.5 Aim of the study

From the cognitive trade-off perspective then, any disruption in performance because of articulatory suppression would suggest that a binding mechanism between the verbal and the spatial codes is taking place and that the VWM and VSWM, though separable systems (Baddeley, 2007), are dependent on one another. However, if there are no significant differences across performances, then this might be more of a reflection of their separability as maintained by the multicomponent WM model (Baddeley, 2007). The aim of this study is to investigate the feasibility of an interface between the VSWM and the VWM, and the possible

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[14] Some studies on why chimpanzees outperform humans in pattern recognition and detailed perception (see Martin, Bhui, Bossaerts, Matsuzawa, & Camerer, 2014 for details) revealed that a chimp's memory for patterns is better than a human's and that a cognitive advantage does somehow exist. Such advantage is attributed to chimpanzees' competitive lifestyle where strategic thinking and pattern detection are necessary to detect enemies. And, unlike humans, chimpanzees have been shown to be better at competitive games than cooperative ones (e.g. Hare & Tomasello, 2004; Yamamoto & Tanaka, 2009; Martin et al., 2014; Matsuzawa, 2013; Tomasello & Herrmann, 2010).

influence on the processing of serial order and location which will, in turn, provide an understanding of the WM functions and limitations. This will be investigated through a dual-task performance using articulatory suppression along with a verbal task or a nonverbal one. Such focus is, to the best of my knowledge, unlike previous studies where although studies have used articulatory suppression in the form of digit recall, but such was limited to testing the capacity for feature retention (colour, shape, size…) of visually presented information and not the capacity for the serial location of patterns. Furthermore, no research as far as I know has attempted to study the direct influence of verbal rehearsal on VSWM compared to chimpanzees. Thus, studies on the role of VI on VSWM show a gap in memory research for the relationship between serial memory for spatial locations and verbal rehearsal embedded in comparative psychology.

Based on the cognitive trade-off hypothesis, it is predicted that participants will perform worse than chimpanzees, but such performance is better in the symbols task than in the numerals task. Furthermore, participants are likely to perform better in the presence of VI because occupying the phonological loop reduces the chances of using verbal rehearsal for recall and according to Matsuzawa's hypothesis, such rehearsal reduces WM capacity.

2. Methodology

2.1 Participants

Participants were 16 English British monolingual students at Lancaster University in the UK aged 18-26 (mean age M= 21.56). There were (7) males and (9) females. They were recruited via social media platforms and email.

2.2 Materials and Procedure

The experiment was an online game adapted from Roberts and Quillinan (2014). Responses were collected utilizing a touch screen design to simulate the original study's set up, but 8-digit sequences were used as VI and chosen randomly for memorization (See Appendix, Table 1).

Because the present study focuses on language as a possible influence on visuospatial working memory, the adaptation of the experiment from Roberts and Quillinan (2014) comprised two sets of tasks: one task that denotes verbal/semantic coding (numerals) and an abstract symbols task that is not easily verbalizable (Figure 1) (Baddeley, 2007; Logie, 1995).[15]
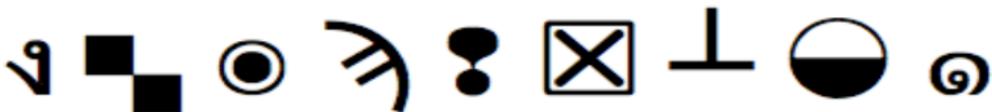

Figure 1. showing the 9 abstract symbols used in the abstract symbol tasks.

Participants had to engage in two sets of tasks: a numerals task and a symbols task each with two variations (one control and one with VI). Each set of tasks completed for each variation included three modes:

a)   An arcade mode that starts with one character then gradually increases the number of characters one by one to all 9. The first character is presented at a longer latency time of about 1300s then the rest are presented at gradually faster speeds until 210ms.

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[15] These specific symbols are adapted from Roberts & Quillinan (2014). It has been argued that even the use of abstract symbols does not necessarily rule out verbal coding processes and such, as Roberts and Quillinan (2014) note, may be a limitation and a reason why no improvements were seen in the abstract symbols task. To further limit the role of verbal coding then, participants are required to occupy the verbal rehearsal system by continuously repeating a simple sequence (e.g. Luck & Vogel, 1997) i.e. engaging in articulatory suppression to prevent verbal recoding of visuospatial information (Baddeley, 2007; Baddeley, Eysenck, & Anderson, 2015; Dent & Smyth, 2005) and the present study utilized 8-digit sequences. The choice for serially ordered numerals as VI comes from the need to activate the same working memory systems (Baddeley, 2007; Baddeley, Eysenck, & Anderson, 2015) hence limiting any unsolicited influence of other cognitive systems that is not of focus in the present study.

b)   A challenge mode that presents all 9 characters simultaneously and gradually decreases latency time from 3s to 210ms.

c)   A chimp mode that starts with 5 characters up to 9. All characters are presented for 210ms.

Participants were instructed to recall the order and location of 9 characters presented in 4 tasks: numerals (Task 1), numerals with VI (Task 2), symbols (Task 3), and symbols with VI (Task 4). After a certain time, the characters were masked by white squares which subjects had to tap on to indicate the recalled order and location of the numerals (See Figure 2).
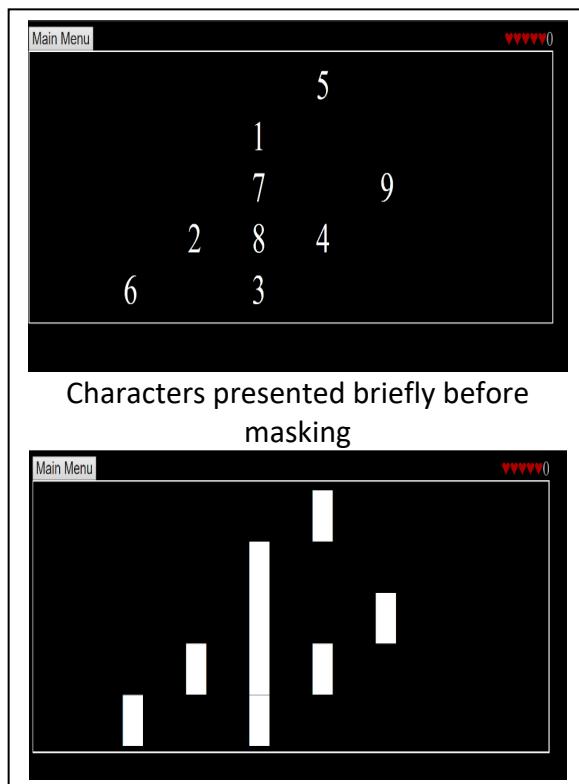
**Figure 2.** *showing a preview of the limited-hold masking task as viewed by participants before masking and after.*

All the tasks followed the same sequence and procedure except in tasks 3 and 4 where VI was introduced. In these two tasks, participants had to memorize and recite the order of an 8-digit sequence while performing each task. The sequence was changed at the end of each round (i.e.

after all lives were lost and the game was over). Participants had to recall the sequence after the end of the round. Failure to recall the sequence at the end suggests that verbal coding may have occurred for the characters being shown.

2.3 Data Analysis

A quantitative analysis was done per subject with calculations of recall accuracy for all 4 conditions: 2 controls, 2 variables.[16] Within each condition, detailed accuracy percentage was calculated per mode: arcade, challenge, and chimp. All these conditions with each mode total to 12 possible variations. Percentage accuracy was calculated as follows:

$$\% \, Accuracy \, (n) = \frac{correct \, number \, of \, clicks \, per \, round}{maximum \, number \, of \, clicks \, per \, round} x \, 100$$

This sole percentage accuracy is part of an aggregated mean accuracy calculated for each attempted numerical capacity (n) by counting the number of trials for that numeral and the average accuracy on each of these trials as follows:

$$\% \, Mean \, Accuracy = \frac{\Sigma \, \% \, Accuracy \, (n)}{number \, of \, trials \, attempted \, (n)}$$

This % Mean Accuracy is taken as a reflection of WM capacity in this study where total percentage accuracy calculations were made for each of the 12 condition variations by calculating the total average for all 16 participants. The conditions are divided per task type (numerals or symbols), mode type (arcade, challenge, or chimp), and variable type (VI or no VI).

3. Results

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[16] The control conditions refer to the numerals task and the symbols task without VI. The variable conditions refer to the numerals task and the symbols task with VI.

A summary of the obtained percentage mean accuracies depending on mode type and task type is shown in Figure 3 along with I&M's in Figure 4. It appears that three main patterns emerge from our results. The first pattern which has been shown throughout the 4 experiments concerns performance being dependent on how many numerals are presented and for how long i.e. performance appeared to be a ramification of numerals capacity and latency time (both of which are dependent on mode type). More specifically, the arcade mode was consistently the easiest for participants as revealed by their relatively higher accuracies than the other two modes whereas the challenge mode was the most difficult with participants scoring even lower than the chimp mode.
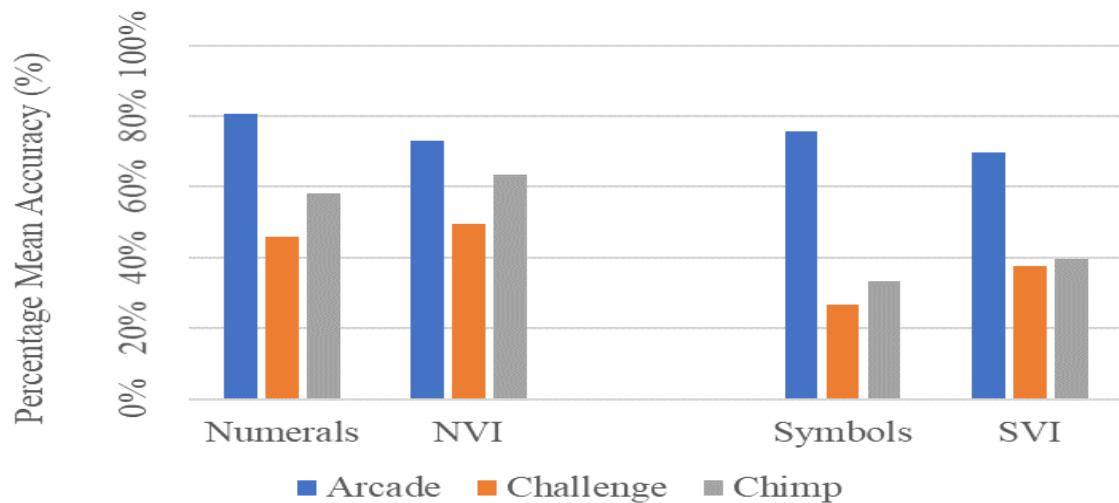

Figure 3. Summary of percentage mean accuracies according to mode type and task type.
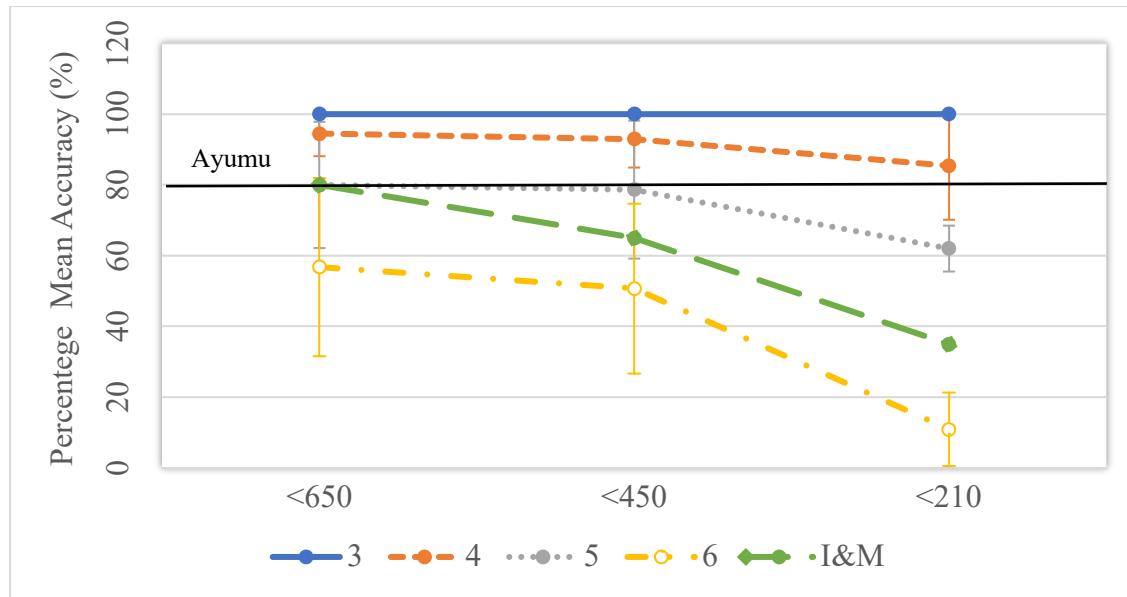
Figure 4. *Percentage Mean Accuracy for 6 numerals compared to Ayumu and the humans from the original I&M study at 3 different latency times.*

The second pattern concerns the influence of VI on accuracy and instead of having a positive influence on performance for all modes as was predicted, a negative influence has been observed depending on mode type in each experiment and is highlighted again in Figure 3. This negative influence was limited to the arcade mode whereas the challenge and chimp modes have improved with the administering of VI. The third pattern observed concerns the numerals task being easier for participants than the symbols task and such is reflected by the obvious higher accuracies for numerals than symbols across all modes (See Figure 3).

4. General Discussion

4.1 The limits of human visuospatial memory compared to chimps

Part of this study aimed to investigate how participants performed compared to the best chimpanzee performer Ayumu and I&M's participants (Inoue & Matsuzawa, 2007, 2009). Results in experiment 1 revealed that although participants performed better than I&M's, they could not perform up to Ayumu's level at 210ms. Performance up to 5 numerals was not

affected (unlike in I&M's) at 650ms or 450ms until latency time decreased to 210ms, which is unlike Ayumu who maintained near-perfect accuracy across all latencies and for all 9 numerals. The participants' accuracy, however, decreased significantly when 6 numerals were presented, and performance was worse at all 3 latency times and was no longer at Ayumu's level. This suggests that as humans, we are limited in our hold capacity to 5 numerals and that we need more time to process these numerals optimally, preferably more than 210ms. This finding is in line with previous research where capacity has been shown to be limited to 3-5 objects regardless of whether each object has different features like colour, shape, and size (Baddeley, 2007; Cowan, 2010; Irwin & Andrews, 1996; Luck & Vogel, 1997; Vogel et al., 2001). Furthermore, previous studies have shown that chimpanzees engage in a preplanning-at-a-glance strategy for coding visuospatial information while humans seem to take more time to do so due to the involvement of semantic processing through verbal coding (Clifton et al., 2016; Dent & Smyth, 2005; Ginsburg et al., 2017; Matsuzawa, 2009) and as previously revealed by eye-tracking research (Kano & Tomonaga, 2009, 2011). Indeed, humans tend to make use of linguistic coding as mnemonic support as we have particularly seen for the nonverbal symbols (Washburn, Gulledge, James, & Rumbaugh, 2007) and while this helps in retaining information for longer periods due to forged semantic associations, it limits the amount of information retained.

As such, our WM capacity appears to be limited especially for visuospatial information due to semantic processing, and according to Cowan (2010), this means that "superior beings from another planet can accomplish feats that we cannot because they have a larger working memory limit, similar to our digital computers …" (p. 56) and this is perhaps because these beings, like Ayumu, do not possess language as mandated by the cognitive trade-off hypothesis giving them an edge in making rapid perceptual judgements of the visual and spatial.

4.2 Language as a negative influence on VSWM capacity

Tasks 2, 3, & 4 have investigated the supposed negative influence of language as seen in previous studies (Inuoe & Matsuzawa, 2007; Matsuzawa, 2011, 2012, 2013) with tasks 3&4 implementing a VI task. Taken together with the previously mentioned WM capacity research, if a language is removed, be it by using a nonverbal stimulus or engaging in articulatory suppression, more storage capacity would be freed to process and retain information. An increase in capacity has been reflected in the present study through an increase in accuracy percentages in the presence of VI (though only for specific modes) but not when a nonverbal task was implemented alone.

Capacity seemed to be limited to 3-5 objects in experiment 2, much like what was found in experiment 1. While it is obvious that for experiment 1 the overt verbal rehearsal of the semantic Arabic numerals might be what adversely influenced accuracy if viewed from the trade-off notion, the expectation was that accuracy would improve with a nonverbal symbols task. However, contrary to the initial prediction of improved performance, results showed a much more negative performance. This would mean that the trade-off notion is rejected. But, based on the strategies utilized to complete the symbols task, it appears that the trade-off notion is made even stronger. Indeed, almost all participants engaged in overt verbal coding of the abstract symbols which conforms with the previous research on chimpanzees and humans (Roberts & Quillinan, 2014) where the use of abstract symbols does not necessarily inhibit the use of verbal rehearsal (Baddeley, 2007; Logie et al., 2000) and such has been found to be the main strategy for nonverbal visuospatial memory where linguistic coding is used as a main retention strategy by humans and language-trained chimpanzees as opposed to other primates (see Washburn, Gulledge, James, & Rumbaugh, 2007). For instance, one participant attempted to name the symbols such as "v" for ٧ and "squares" for ▛. Another participant used "two

circles" for ◉ and "bow" for ᾳ. These examples highlight how as humans we tend to interact semantically with visual information. In other words, it seems as though we are incapable of processing foreign information unless it is semantically coded (Bouma, 1987; Ginsburg et al., 2017). Such coding of the symbols then may have resulted in a negative effect on performance as making meaning out of the visual field seems to occupy too much time as is seen in several visual scanning activities and contrary to chimpanzees' rapid all-at-once scanning strategies (Clifton et al., 2016; Kano & Tomonaga, 2009, 2011; Myowa-Yamakoshi, Scola, & Hirata, 2012). Furthermore, familiarity with the Arabic numerals, as opposed to the abstract symbols, cannot be neglected as humans and language-trained chimpanzees have been shown to perform better when the symbols are linguistically meaningful as opposed to completely new ones that needed to be semantically coded before processing and retention (Washburn, Gulledge, James, & Rumbaugh, 2007).

Regardless of how information was presented, and unlike previous studies on articulatory suppression and VI, an overall increase in accuracy was observed in the presence of VI which confirms the trade-off notion and further explains why WM capacity might be limited at least in the present study. Furthermore, some participants have reported that the presence of VI has allowed them to engage in the hold task unconsciously which may suggest that shifting serial focus to a secondary verbal task has suspended conscious rehearsal of the primary task (which is the premise of the notion of articulatory suppression e.g. Baddeley, 2007; Baddeley, Eysenck, & Anderson, 2015; Cornoldi & Vecchi, 2003; Logie, 1995) but has actually caused accuracy to increase (and not remain unchanged despite attentional shift as in Johnson, Hollingworth, & Luck, 2008). Participants further mentioned that the VI has provided a rhythm for them to tap on character locations be it in the symbols task or numerals task and indeed when participants made errors in the to-be-recalled sequence, performance broke down. However, I argue that it

is not a rhythm that the VI has provided but as mentioned it has caused a temporary suspension of verbal rehearsal of the digits and indeed this is revealed by the mistakes made in reciting the VI. For instance, participants often started a VI sequence correctly but halfway through a trial, they started citing the digits presented on the screen causing performance to break down when attempting to shift back to the VI sequence again. This could mean that engaging in overt articulatory suppression in a secondary task can improve the visuospatial capacity of the primary task i.e. when language is suppressed, visuospatial memory improves which means for a brief moment in time we may have gained the visuospatial cognitive abilities of chimpanzees or eidetic memory due to the absence of language (Matsuzawa, 2009, 2011, 2012, 2013) but this seems to be dependent on the pattern of serial order presentation.

4.3 Patterns of serial order presentation and influence on VSWM capacity

The present study revealed an unexpected pattern regarding mode of presentation of characters. The arcade mode, in which characters are presented sequentially with decreasing latency time, has been found to be the easiest mode but negatively influenced by VI. On the other hand, the chimp mode (which presents 5 characters simultaneously at 210ms) and challenge mode (which presents all 9 characters simultaneously with decreasing latency time) have both been positively influenced by VI and harder than the arcade mode, with the challenge mode being the hardest. These results suggest that the pattern of presentation of serial order could be a factor influencing VSWM capacity.

The fact that our participants consistently scored better in the arcade mode implies that as humans we process information better when it is presented in chunks and not all at once. Such finding is consistent with previous encoding theories of visuospatial information pertaining to the primacy model (Baddeley, 2007; Logie et al., 2016). According to the primacy

model, participants were able to recall items sequentially by associating them with the first item but with decreasing strength hence errors in recall have risen due to decay. Such decay appears to be counteracted through rehearsal where performance was better in the absence of VI, but its presence as predicted by the primacy model has made the characters (numerals and symbols alike) vulnerable to trace decay. This decay is more pronounced when VI is phonologically similar to the recalled items (Baddeley, 2007, Baddeley, Eysenck, & Anderson, 2015; Logie, 1995) which were observed in a slightly more negative influence for the numerals task than the symbols task where VI- which is also a numerical sequence- decreased accuracy by about 3% more in the numerals task (See Figure 3). Such phonological similarity effect has been noted before (Baddeley, 2007, Baddeley, Eysenck, & Anderson, 2015) and being a language component further asserts the negative influence of language on recall.

Another unexpected finding was that the challenge mode, and not the chimp mode, was consistently the hardest for participants. These low scores observed in the challenge mode – which presents all 9 characters simultaneously as opposed to 5 numerals only like in the chimp mode- suggests limitations in capacity for a number of objects and not only their features which is something that previous studies did not fully investigate (Baddeley, 2007; Cowan, 2010). Much like our capacity for 3-5 features (Baddeley, 2007; Cowan, 2010; Luck & Vogel, 1997; Vogel et al., 2001), spatial capacity for object locations seems to be limited to 3-5 characters at least when characters are presented all at once. This capacity seems to be slightly better when characters are presented sequentially suggesting the utilization of different strategies to encode and recall visuospatial information (Kano & Tomonaga, 2009, 2011; Matsuzawa, 2013; Myowa-Yamakoshi, Scola, & Hirata, 2012). For instance, some participants reported the use of hand gestures to draw a line pattern between characters during the encoding process and try to replicate this pattern in the recall process while at the same time verbally coding the

characters i.e. they attempted to make semantic associations through both a visual code and a phonological code and both of these codes have been previously shown to support immediate visuospatial recall of serial order (Dent & Smyth, 2005; Logie et al., 2000, 2016; Washburn, Gulledge, James, & Rumbaugh, 2007). In other words, the two WM subcomponents do not appear to be as separable as is posed by most WM models but on the contrary, there is crosstalk happening between them whether in humans or language-trained chimpanzees (Baddeley, 2007; Washburn, Gulledge, James, & Rumbaugh, 2007).

5. Conclusion

What this study has shown, relative to the small sample size, is that language as verbal coding, can influence VSWM capacity in different ways. However, what these findings reveal is that the long argument surrounding the separability of WM subcomponents, VSWM and VWM, might be neglecting their interaction in operations as simple as recall of serial order. Furthermore, while we might think that language makes us superior, we must be reminded that other creatures out there may do things we cannot because they do not have language, a skill we fully labelled our own. In addition, while language might be disadvantageous for certain tasks, it is rather invaluable for others especially when we depend on our linguistic capabilities to create new things, share ideas, and imagine our future. Such language advantages are long-held by bilingualism and investigating the controversy of the bilingual advantage relative to the trade-off notion studied in this paper may reveal other interesting patterns.

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Appendix

Table 1

8-digit sequences used as verbal interference

21 43 58 68	22 31 90 78	21 33 89 58
26 14 77 38	29 38 72 28	23 29 00 78
25 82 37 98	29 04 88 98	21 44 98 28
20 69 31 48	29 74 93 08	29 03 67 08
29 94 71 88	20 66 23 58	27 03 55 78

*Note: sequences were chosen randomly by the researcher and varied from one mode to the next. Each sequence had to be recalled once all trials ended for each mode.
Mode refers to arcade, challenge, or chimp mode.

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