Synchronous and asynchronous distance learning of anaphora in foreign languages: an experimental study

Ensino síncrono e assíncrono a distância de anáfora em línguas estrangeiras: um estudo experimental

Amanda Maraschin Bruscato [iD] [*1] and Jorge Baptista [iD] [†1,2]

[1]Universidade do Algarve, Portugal.
[2]Instituto de Engenharia de Sistemas e Computadores, Investigação e Desenvolvimento em Lisboa, Portugal.

Abstract

This paper analyses the influence of the distance learning modality (synchronous/asynchronous) in the learning of anaphora in English and Spanish as foreign languages, based on the results of a course offered to 45 Modern Language students at a Brazilian university in the first semester of 2020. Factors as the level of proficiency, type of task, and degree of motivation were also considered in this experimental study. Two experimental groups and one control group were compared in four written tests. English learners demonstrated a higher prior knowledge of anaphora than Spanish learners and showed the best test results. A positive and moderate correlation was found between the knowledge of anaphora, level of proficiency, and degree of motivation to study the language. Although the experimental groups made progress in the reading tests, the same did not happen in the writing tests. Finally, the difference was not significant between the two experimental groups.

Keywords: Anaphora. Distance learning modalities. Foreign languages learning.

Resumo

Este artigo pretende analisar a influência da modalidade de ensino a distância (síncrona e assíncrona) na aprendizagem da anáfora em inglês e espanhol como línguas estrangeiras, com base nos resultados de um curso oferecido a 45 estudantes de Letras de uma universidade brasileira no primeiro semestre de 2020. Neste estudo experimental, também foram considerados fatores como o nível de proficiência, grau de motivação e tipo de tarefa. Dois grupos experimentais e um grupo de controle foram comparados, ao longo de quatro testes. Os estudantes de inglês demonstraram maior conhecimento prévio de anáfora do que os de espanhol e apresentaram melhores resultados nos testes. Identificou-se uma correlação positiva e moderada entre o conhecimento de anáfora, o nível de proficiência e o grau de motivação para estudar a língua. Apesar de os grupos experimentais progredirem nos testes de compreensão, o mesmo não ocorreu nos testes de produção escrita. Por fim, não houve diferença significativa entre os dois grupos experimentais.

Palavras-chave: Anáfora. Modalidades de ensino a distância. Aprendizagem de línguas estrangeiras.

1 Introduction

In 2020, many educational institutions around the world had to adapt their classes to the distance learning environment because of the COVID-19 (Coronavirus Disease 2019) pandemic. In a recent study, Bruscato and Baptista (2020b) have found that students and professors at different Brazilian and Portuguese universities have a negative perception about distance learning. However, since it is the safest option during the pandemic, it is necessary to investigate if the synchronous or asynchronous modalities have different effects on learning outcomes.

For this article, we have decided to investigate how the learning of anaphora in English and Spanish as foreign languages is affected by synchronous and asynchronous learning. We also aim to answer how it is affected by students' motivation and proficiency in the languages. It is possible that Portuguese native speakers have better outcomes when learning Spanish, since these languages are more similar

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*Email: amandabruscato@gmail.com
†Email: jbaptis@ualg.pt

than Portuguese and English, and that students with higher motivation and proficiency levels may have the highest learning outcomes. We also believe that students from the asynchronous group may have better outcomes, since they have more chances to practice their reading and writing on forums than students from the synchronous group, who will be listening and speaking on videoconferences.

Thus, this study addresses the following research questions (Q): Are there differences in the learning of anaphora depending on (Q1) the distance learning modality; (Q2) the foreign language studied; (Q3) the assessment of reading or writing; (Q4) the level of proficiency in the foreign language; and (Q5) the participants' degree of motivation?

To answer these questions, a short course was taught in the first semester of 2020 to 45 undergraduate students with a major in English or Spanish at the Federal University of Rio Grande do Sul. Participants with intermediate/advanced level in the languages were randomly assigned into two experimental groups and one control group, and their learning outcomes were statistically compared based on four written tests. An initial questionnaire was applied, 2 lessons were offered, and 4 written tests were performed.

Anaphora is an important cohesive mechanism, and its knowledge is indispensable for communication in the language. Instead of overusing nominal repetition, as in (1a), speakers can use pronouns (1b), or ellipsis (1c), to refer to the antecedent in the text.

(1a) Anna$_i$ wakes up every morning and Anna$_i$ goes to work.
(1b) Anna$_i$ wakes up every morning and she$_i$ goes to work.
(1c) Anna$_i$ wakes up every morning and $\emptyset_i$ goes to work.

English and Spanish are the most widely spoken European languages in the world (EBERHARD; SIMONS; FENNIG, 2020) and differ from each other in terms of anaphora resolution strategies, for example by the use or not of grammatical gender and by the Null Subject Parameter (CHOMSKY, 1981; RIZZI, 1982). Besides teaching the main anaphora processes in these two languages, the course was designed to collect data on the students' learning progress in relation to this linguistic mechanism. The legally required authorizations were obtained from the institution; students were informed accordingly, and all agreed to participate in the research on a voluntary basis.

In the next two sections, a brief literature review on anaphora and on distance learning will be presented. Then, the research method will be described and, finally, the results will be discussed. The article ends with the establishment of conclusions and indications for future work.

2 Anaphora

In the *Common European Framework of Reference for Languages* (COUNCIL OF EUROPE, 2009, p. 140), types of anaphora are considered forms of textual cohesion that should be taught to all language learners, especially from level B1. The document is used alongside specific frameworks in the development of national curricula and proficiency tests. These tests assess proficiency in the use of anaphora by integrating it into the criteria used to measure the learner's knowledge of textual cohesion.

Cohesion is defined by Halliday and Hasan (1976, p. 4) as the relations of meaning in the text, which can be established by using a linguistic element (*anaphor*) dependent semantically on the element to which it refers (*antecedent*). Grammatical reference can be *exophoric* if it concerns something outside the text, as seen in (2), below, where the pronoun this refers to something extralinguistic; or it can be *endophoric* if the antecedent is in the text, as seen in (3a) and (3b). The endophoric reference may be *anaphoric* if the anaphor takes up a previously mentioned antecedent, as in the case of (3a), in which the pronoun *it* refers to *a pen*; or *cataphoric* if it anticipates something that will soon be mentioned, case of (3b), in which the pronoun *this* refers to *be gentle*.

(2) This does not belong to me.
(3a) I found a pen$_i$, but it$_i$ does not belong to me.
(3b) I just say this$_i$: be gentle$_i$.

Halliday and Hasan (1976) differentiate grammatical cohesion from lexical cohesion (where there

is nominal repetition) and separate *reference* from *substitution*. According to the authors, reference would establish semantic relations, while substitution would establish grammatical relations. They also present the *ellipsis*, seen in (4a), apart from substitution, exemplified in (4b), although they agree that ellipsis may be a type of substitution. In (4a), there is the elision of *coffee* in the second clause, and in (4b), the *same* refers to *order a coffee*. After the examples, the authors' types of cohesion are presented in Figure 1.

(4a) I want to order a coffee$_i$, I imagine she wants to order another $\emptyset_i$.
(4b) I want to order a coffee$_i$, I imagine she wants the same$_i$.
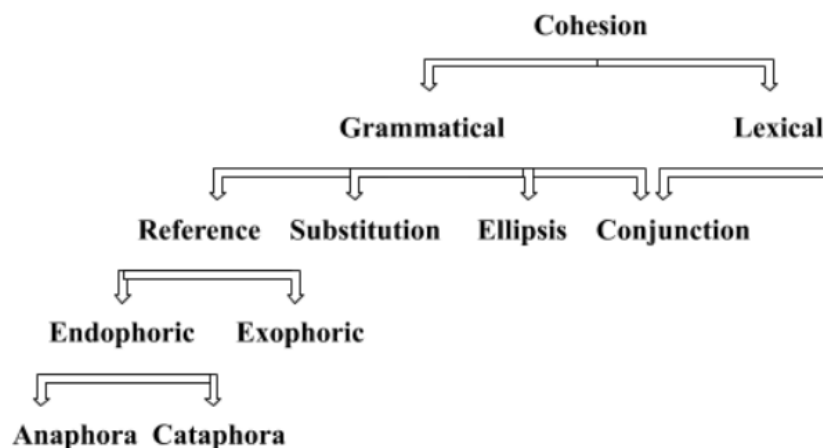
Figure 1. Cohesion.
Source: Halliday and Hasan (1976).

Based on Halliday and Hasan (1976), the Brazilian authors Fávero and Koch (1985) proposed a new classification of cohesion, dividing it into referential, sequential, and lexical. After the publication of their study, however, the authors reviewed their positions and reclassified cohesion, each in their own way. Fávero (2010) divided it into referential, sequential, and recurrent; while Koch (2010) divided it only into referential and sequential.

According to Fávero (2010, p. 18-25), *referential cohesion* - the focus of this paper - occurs when the interpretation of a linguistic element depends on the interpretation of the element to which it refers, either by substitution or reiteration. While referential cohesion by *reiteration* uses the repetition of expressions in the text, seen in (5a), referential cohesion by *substitution* is achieved by ellipsis (zero anaphora), exemplified in (5b), or by a *pro-form, i.e.,* a grammatical element that carries the meaning of the element it replaces (FÁVERO, 2010, p. 19), as seen in (5c). After the examples, the author's types of cohesion are presented in Figure 2.

(5a) Mary$_i$ went to the theater and Mary$_i$ did not like the play.
(5b) Mary$_i$ went to the theater and $\emptyset_i$ did not like the play.
(5c) Mary$_i$ went to the theater and she$_i$ did not like the play.

In this article, the learning of referential cohesion, referred here as *anaphora*, will be investigated. The research focuses on the learning of anaphora in English and Spanish as foreign languages by Brazilian Portuguese native speakers. It is possible that, due to the similarity of Portuguese and Spanish in relation to grammatical gender and the Null Subject Parameter (CHOMSKY, 1981; RIZZI, 1982) – which allows the omission of the subject in various contexts -, Brazilian students may find it easier to solve anaphora in Spanish than in English.

The process of interpreting the anaphor is also called *anaphora resolution* (HIRST, 1981; MC-DONALD; MACWHINNEY, 1995; MITKOV, 2005) and it can be study from different linguistic perspectives, such as syntactic, semantic, and pragmatic (ARIEL, 1994; ARNOLD, 2001; GROSZ; JOSHI; WEINSTEIN, 1995; RAHMAN; NG, 2011). Even so, it can be said that scholars in general tend to agree with the definition of anaphora as the relation between linguistic elements, where the
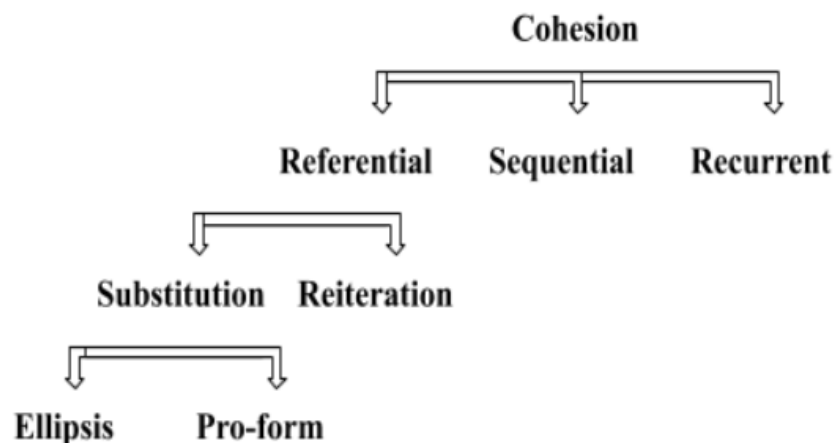
Figure 2. Cohesion.
Source: Fávero (2010).

interpretation of the anaphor depends on the interpretation of its antecedent (HUANG, 2000, p. 1).

The perspectives described above (Halliday and Hassan, Fávero and Koch) are semantic-discursive, considering not only the intraphrasic context but also the transfrastic, which covers more than one sentence. In our study, we adopt the multi-strategic approach proposed by Carbonell and Brown (1988). The authors explain that anaphora resolution is not an exclusively morphological, syntactic, semantic, or pragmatic process, but that it integrates these various dimensions. They then define preferences and restrictions of these four orders as criteria for the resolution of anaphora. For example, in (6a), due to semantic restrictions, it is known that the pronoun *it* refers to *the pie*; but in (6b), it is known that *it* refers to *the table*. In addition to the semantic restriction, there are gender and number restrictions in this case, as *it* could not refer to a person nor to more than one antecedent.

(6a) John took the pie$_i$ off the table and ate it$_i$.
(6b) John took the pie off the table$_i$ and cleaned it$_i$.

Several studies have analysed anaphora resolution in the context of foreign languages learning, many through the analysis of learner corpora. A learner corpus is a collection of linguistic data produced by learners of a foreign language (MCENERY; XIAO; TONO, 2006, p. 65). According to Mitchell, Myles, and Marsden (2013, p. 288), the use of electronic corpora and computer tools allows for a better and more systematic analysis of grammatical learning processes in a second language learning context.

Lozano (2016) investigated the use of anaphora in the *Corpus Escrito del Español L2* and showed that learners consider it more important that the content communicated is clear and unambiguous than concise. They prefer, therefore, to make explicit the subject to eliminate any possible ambiguity than to leave some doubt as to its antecedent.

Pretorius (2005) investigated the relationship between university students' academic performance, proficiency in English as a second language, and knowledge of anaphora. The author discovered that the participants with less knowledge of anaphora did not have a good academic performance and suggested that, without the understanding of the cohesive mechanism, it was because they could not effectively understand the readings required in the course. The author also found that, in higher levels of proficiency in the second language, the differences between students' knowledge of anaphora were smaller. This research demonstrated the relevance of anaphora for reading in the foreign language and academic performance.

Ellis (2008, p. 608-9) presents a compilation of studies that have investigated foreign language learners' knowledge of anaphora. However, they do not analyse the impact of teaching or the learning modality. Research on this topic will therefore be discussed in the next section.

3 Distance learning

Distance learning, currently possible using the New Information and Communication Technologies, can be carried out through synchronous or asynchronous lessons. In the first case, individuals must be connected at the same time to participate in video conferences and chats. In the second case, they can watch video lessons, answer exercises, and participate in discussion forums at different times. The two modalities have opposite advantages and disadvantages: while the synchronous class allows live contact between participants and further development of oral production but restricts the possibility of access to a certain day and time; the asynchronous class makes access more flexible and provides further development of written production but does not offer live contact.

The distance learning modalities have been studied by several authors, such as Chou (2002) and Skylar (2009). Chou (2002) analysed the interaction between students in synchronous and asynchronous classes. The author concluded that smaller groups interact more and that students spend more time interacting in asynchronous discussions than in synchronous ones. In Skylar's (2009) survey, 44 students participated in both the synchronous and asynchronous course. Both modalities were effective for learning, though most students preferred synchronous lessons because of the greater interactivity with the teacher and their peers.

Specifically on foreign languages, Chen, Liu, and Wong (2007) compared synchronous and asynchronous learning using Krashen's (1982) theory of second language acquisition. According to the authors, synchronous learning allows for more communication and natural language acquisition, while asynchronous learning allows for greater access to extra materials and automatic exercises, as well as it offers students more time to study and to correct their own productions. Similarly, Sotillo's (2000) concluded from her study with 25 English learners that synchronous discussions allow for more spontaneous interaction, while asynchronous discussions allow students to review their writing.

Although many studies have analysed foreign language learners' knowledge of anaphora and others (which will continue to be discussed below) have analysed the impact of the learning modality on language learning, few studies have linked these two topics, which is the aim of this paper.

Some reviews on the effectiveness of Computer Assisted Language Learning (CALL) in recent decades have been undertaken by Stockwell (2007) and Liu et al. (2002). Other literature reviews have analysed the impact of CALL specifically on the teaching of reading (KIM, 2002) or writing (YANG; ZHAO; LI, 2012) in English. Although CALL can be used in synchronous and asynchronous learning, in this paper, we use the term to refer to the asynchronous distance learning modality.

Macaro, Handley, and Walter (2012) compiled the research on the impact of CALL on foreign language school education from 1990 to 2010. A total of 117 studies were found, of which 90 dealt with English teaching. The authors selected, for a more detailed analysis, the 47 publications of this century on English teaching in schools. They criticized the quality of research due to methodological flaws. As an example, they mentioned studies that affirmed progress in student learning but did not conduct initial tests with students, as well as others that did not compare the data of an experimental group with that of a control group.

Despite the existence of several investigations on the impact of the learning modality on foreign language learning, only two publications were found which dealt specifically with the impact of the learning modality on the learning of anaphora. According to Li, Swanson, and Tomei (2014, p. 72), in previous research, CALL has proved to have a positive impact on reading in foreign languages, but little has been investigated about its effectiveness in learning discursive mechanisms such as anaphora.

Liu (2010) investigated whether the type of *feedback* used in CALL would have any impact on the learning of pronominal anaphora in English as a second language. 28 Chinese students, aged between 19 and 40 and with intermediate proficiency in English, participated in this research. The participants took an initial test, computer exercises on anaphora for half an hour, and finally a final test. One group received the explanatory *feedback* (besides right/error, the explanation of the error) and the other group received only the message of "right" or "wrong". There were no differences between the results of the two groups. However, the two tests applied were the same, which may have compromised the results.

Although Liu (2010) concluded from his research that the explanatory *feedback* did not lead

to differences in student learning, other studies have shown the opposite (LYSTER; RANTA, 1997; HEIFT, 2004; MACKEY; GASS, 2006). Though there is no consensus on the impact of the types of *feedback* on learning, it was decided that the *feedback* offered in the course exercises for all learning modalities would be of an explanatory nature. The explanatory *feedback* is defined as *metalinguistic* by Lyster and Ranta (1997, p. 47) and seems to be the most appropriate for this research as the participants are undergraduate students with a major in modern languages who need to know and use grammatical terms in their profession.

While Liu (2010) studied the impact of computer *feedback* on the learning of anaphora in English, Li, Swanson, and Tomei (2014) compared the learning of zero anaphora in Chinese as a foreign language depending on the learning modality. Her research, however, considered only the understanding of anaphora in Chinese, not its production, and compared asynchronous learning with in-person learning. During two weeks, 45 university students from the United States of America who had their regular in-person Chinese classes were divided into three groups: one that received in-person instruction on anaphora; one that received instruction through CALL; and one that did not receive any instruction on the topic. The participants answered a questionnaire, a pretest, an immediate posttest, and a delayed posttest after one month. The CALL group obtained the best results, followed by the in-person group, and finally by the control group. The author suggested that the CALL students, probably due to the learning modality, demonstrated greater autonomy, dedication, and interest in the learning.

The present article aims to investigate the impact of synchronous and asynchronous distance learning modalities in the learning of anaphora in English and Spanish reading and writing. The following section will explain the research method adopted.

4 Method

As explained in the introduction, this paper aims to answer whether there are differences in the learning of anaphora depending on: the distance learning modality (Q1); the foreign language studied (Q2); the assessment of reading or writing (Q3); the level of proficiency in the foreign language (Q4); and the participants' degree of motivation (Q5).

This longitudinal study used the experimental method and statistically analyses quantitative data collected from learners. Before it was carried out, the project received approval from the university ethical board. A total of 45 undergraduate students at the Federal University of Rio Grande do Sul with a major in English or Spanish and with an intermediate/advanced knowledge of the language volunteered to participate in the research. The distribution of the sample by group is presented in the Table 1. The majority was female (73%) and the median age was 20 years old (age varied between 18 and 41 years old). Most of them studied English (67%) and were in the third semester (62%) of their course. The number of participants does not allow the results to be generalised, but it offers data for preliminary analysis.

Table 1. Distribution of the sample by group.

Language	Spanish		English	
Group	III	V	III	V
Synchronous	2	3	7	3
Asynchronous	3	2	7	3
Control	2	3	7	3

Source: Own elaboration.

For each language, students from the third and fifth semesters were randomly distributed between two experimental groups and one control group. The experimental groups participated in two lessons on anaphora in their target language (independent variable), and test results from the three groups were compared (dependent variable). The university e-learning platform (*Moodle*) was used for the lessons. Each synchronous lesson used videoconference for 90 minutes; for asynchronous lessons, short videos, texts, discussion forums, and automatic exercises were used.

After signing the Informed Consent Form, all participants answered the *Motivated Strategies for Learning Questionnaire*, developed by Pintrich et al. (1993) and translated, reduced, and validated in Portuguese by Mckeachie, Melo, and Mendes (2008); a proficiency test with 20 reading questions, taken from Cambridge University or Cervantes Institute, equally distributed between levels A2 and C1; and 4 written tests which measured students' knowledge of anaphora in the foreign language. There was a pretest before the first lesson, a first posttest after the first lesson, a second posttest after the second lesson, and a third posttest one month after the end of the course.

The MSLQ is measured by a 7-point Likert scale, from 1 (completely false) to 7 (completely true), and has, in the Portuguese version, 28 items divided in the *Motivation* and *Learning Strategies* sections. The first includes the *Value*, *Expectancy*, and *Affective* Components; the second includes the *Cognitive and Metacognitive Strategies*, and *Resource Management Strategies*. Each component/strategy includes certain constructs, in which the items are framed. Except for the *Test Anxiety* construct, a positive score represents a positive result.

Each lesson in this study (intervention with the experimental groups) included the following moments: activation of prior knowledge on the topic; lecture on anaphora for half an hour; reading and analysis of material; group discussion; reading and writing exercises; and feedback. Some practical differences between synchronous and asynchronous modalities were: the lecture, which was either live or recorded; the discussions, which took place orally live or in written forums; and the feedback, which was done after all the students in the class had finished each activity or automatically on the computer after each exercise. While synchronous learning allows for a greater contact between peers and with the teacher, asynchronous learning allows for automatic feedback and access to a greater amount of information, in addition, of course, to flexibility of time.

In the first lesson, students introduced themselves; learned about cohesion; the types of anaphora; and the subject, object, and possessive pronouns in the language of study; worked with corpus; completed sentences with the correct pronouns; and did an exercise similar to the test. In the second lesson, they were challenged to solve the ambiguity of some sentences; learned about ambiguity resolution, demonstrative, and relative pronouns; corrected and completed some sentences with pronouns; analysed the coreferences in a fable, comparing their manual analysis with an automatic one; and, again, they did an exercise like the test. The designing of the course is further discussed in Bruscato and Baptista (2021).

The tests had two parts: first, students had to read the beginning of a narrative and correct the mistakes they found (there were 10 different errors of anaphora – wrong anaphors). Then, they should write an end to the story (100-150 words). Since the four tests should be comparable, the narratives were written by the researchers and validated by English and Spanish native speakers. The 10 types of errors (distributed differently in the texts) were: (e1) an unnecessary subject pronoun; (e2) a missing indirect object pronoun in Spanish or a subject pronoun in English; (e3) an unnecessary nominal repetition; (e4) a pronoun instead of a possessive determinant; (e5) a wrong demonstrative; (e6) a wrong relative pronoun; (e7) a reflexive pronoun missing in Spanish or used unnecessarily in English; (e8) a masculine determinant instead of a neuter pronoun in Spanish or an object pronoun instead of a possessive determinant in English; (e9) a personal pronoun used to retake a non-human antecedent; (e10) and a determinant before a relative pronoun in Spanish or a subject pronoun instead of an object pronoun in English.

The different types of errors in the texts are highlighted in bold below.

Text in English:

*John and Mary were twins and **they were** (e1) only twelve years old when **(e2) b**ecame orphans. Before **these** (e5) misfortune, **John and Mary** (e3) lived with **them** (e8) parents, Joseph and Ana, **that** (e6) loved **they** (e10) very much. They were all happy, until the country declared war. Joseph was sent to fight, and his wife had to take care of the children and the house. One day, a letter from the government arrived. Ana already knew **her** (e9) content: **hers** (e4) husband was dead. The widow became **herself** (e7) deeply depressed and could not get out of bed. In despair, John and Mary decided to visit the only neighbour they had (they called her witch) to ask for help.*

Text in Spanish:

*Juan y María eran gemelos y tenían solamente doce años cuando **ellos** (e1) se quedaron huérfanos. Antes de **aquel** (e5) infortunio, **Juan y María** (e3) vivían con **suyos** (e4) padres, José y Ana, **a que** (e6) amaban mucho. Todos eran felices, hasta que el país declaró guerra. José fue llamado a luchar y su esposa tuvo que cuidar sola de sus hijos y de la casa. Un día, llegó una carta del gobierno. Ana ya sabía **el** (e8) que **ella** (e9) decía: su esposo había muerto. Desde entonces, la viuda entró en profunda depresión y n**o** (e7) **l**evantaba más de la cama. Desesperados, los niños decidieron visitar a la única vecina que tenían, a **la** (e10) quien llamaban bruja, para pedi**r** (e2) **a**yuda.*

The first part of the tests was automatically analysed by the comparison of the given text with errors and of students' texts with the corrections. The second part of the tests was manually analysed by the researchers, who compiled a corpus and looked specifically for anaphoric errors such as lack of pronouns, the use of wrong or unnecessary pronouns, the creation of ambiguity, and excessive nominal repetition. The results were quantified and statistically analysed.

In the next section, results are presented and discussed. Only data from those who participated in all tasks are used for analysis. In the synchronous group, students have been monitored by the attendance list, class records, and materials used. In the asynchronous group, learners have been monitored by access to *Moodle* and their participation in forums and exercises. The distance learning platform is provided by the university and records students' access to the course.

5   Results

An initial questionnaire was applied to assess participants' contact with technologies, level of proficiency and motivation. Results have shown that all participants have internet connection in their homes, 96% are familiar with technological devices, 84% use them for at least 3 hours a day, and 87% use them frequently to study. All students have weekly contact with the foreign language outside the university. While 60% of Spanish learners have studied it for less than 3 years, 93% of English learners have studied it for longer.

In self-assessment questions, 40% of Spanish students considered their reading in the foreign language "reasonable" and their writing "bad"; these options were selected by only 10% and 3% of English students, respectively. The classification of writing as "very good" was not used by any Spanish student but by 13% of English students. The distribution of the answers is organised in Table 2.

Table 2. Self-assessment of reading and writing in the foreign language.

Language	Group	Reading			Writing			
		Reasonable	Good	Very good	Bad	Reasonable	Good	Very good
Spanish	Synchronous (N=5)	40%	20%	40%	40%	20%	40%	0%
	Asynchronous (N=5)	40%	40%	20%	40%	40%	20%	0%
	Control (N=5)	40%	60%	0%	40%	40%	20%	0%
English	Synchronous (N=10)	10%	40%	50%	0%	30%	50%	20%
	Asynchronous (N=10)	0%	70%	30%	10%	40%	40%	10%
	Control (N=10)	20%	50%	30%	0%	70%	20%	10%

Source: Own elaboration.

In the foreign language grammar test, which contained 20 multiple choice questions taken from Cervantes' and Cambridge's proficiency tests, the results (presented in Table 3) between the groups were similar. The English groups, however, scored a few less questions than the Spanish groups.

Finally, students responded to the adaptation of the *Motivated Strategies for Learning Questionnaire*(MSLQ) in Portuguese. The experimental groups' means for the constructs are organized in Table 4. The data collected was statistically analysed through the SPSS v.26 program (IBM CORPORATION, 2020). Standard deviation was usually around 1 and always below 2.

No significant differences were found between the groups. In general, responses were similar and positive. The main results were students' high interest in language learning (*Task Value*) and confi-

Table 3. Grammar test results.

Language	Group	Mean	Standard deviation
Spanish	Synchronous (N=5)	15	2
	Asynchronous (N=5)	15	2
	Control (N=5)	14	5
English	Synchronous (N=10)	12	4
	Asynchronous (N=10)	14	3
	Control (N=10)	13	5

Source: Own elaboration.

Table 4. Experimental groups' results in MSLQ.

Language		Spanish		English	
Group		Synchronous (N=5)	Asynchronous (N=5)	Synchronous (N=10)	Asynchronous (N=10)
Motivation Section					
Value Components	Extrinsic Goal-orientation	4.2	3.5	5.0	4.7
	Task Value	6.3	6.2	6.8	6.8
Expectancy Components	Control of Learning Belief	3.8	4.2	5.5	4.6
	Self-efficacy for Learning and Performance	5.2	4.8	5.5	5.7
Affective Components	Test Anxiety	3.9	4.8	5.1	4.6
Learning Strategy Section					
Cognitive and Metacognitive Strategies	Elaboration	5.8	5.9	6.1	6.3
	Organisation	6.4	5.1	5.4	5.8
	Critical Thinking	5.3	4.7	5.2	5.4
	Metacognitive Self-regulation	5.4	5.1	5.6	5.7
Resource Management Strategies	Time Management and Study	4.3	4.5	4.5	4.4

Source: Own elaboration.

dence that they can learn the subject (*Self-efficacy for Learning and Performance*). In addition, they present good learning strategies such as linking contents (*Elaboration*), organisation (*Organisation*), and self-regulation for study (*Metacognitive Self-regulation*).

After checking students' level of proficiency in the languages and motivation to study them, their results in the tests will be presented and discussed. The data from the reading part of the tests is organised below in Tables 5 and 6.

Table 5. Reading tests in Spanish.

	Synchronous (N=5)				Asynchronous (N=5)				Control (N=5)			
	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
e1	2	3	4	4	2	3	4	5	2	2	2	3
e2	0	2	1	5	2	4	1	5	1	1	0	2
e3	1	5	4	5	1	3	4	4	1	1	1	2
e4	2	4	3	2	3	5	4	2	5	4	3	0
e5	0	3	1	4	1	2	2	4	1	1	1	2
e6	0	2	4	5	2	4	4	3	1	3	2	2
e7	2	1	2	3	1	1	3	2	1	0	1	1
e8	5	3	0	4	5	5	2	3	4	3	1	2
e9	1	2	5	3	2	4	3	3	2	2	2	2
e10	2	4	4	5	3	4	3	3	2	3	2	2
Total	15	29	28	40	22	35	30	34	22	19	15	18

Source: Own elaboration.

Table 6. Reading tests in English.

	Synchronous (N=10)				Asynchronous (N=10)				Control (N=10)			
	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
e1	0	7	9	9	0	5	8	9	0	0	0	2
e2	6	8	9	9	7	8	6	7	5	6	5	8
e3	0	5	7	8	0	5	6	8	0	0	0	1
e4	10	7	9	10	10	8	10	7	10	9	9	6
e5	6	6	9	9	7	9	9	10	7	9	10	9
e6	3	9	5	8	2	10	7	6	2	8	4	8
e7	4	8	9	10	3	10	10	10	3	3	5	2
e8	10	10	10	10	10	10	10	10	10	10	10	10
e9	8	10	10	10	5	10	10	9	9	10	10	10
e10	10	10	10	9	7	10	10	9	9	10	10	9
Total	57	80	87	92	51	85	86	85	55	65	63	65

Source: Own elaboration.

In the first part of the Spanish pretest, most students were able to identify and correct errors numbers 4 (67%) and 8 (93%), which presented respectively the wrong use of a possessive determinant and a male determinant instead of a neutral pronoun. The initial results of the synchronous group were lower than those of the other groups. The maximum score was 50 per group, and while the control and asynchronous groups hit 22 questions each, the synchronous one hit 15.

In the first part of the English pretest, no student noticed the mistakes numbers 1 and 3, of subject pronoun and unnecessary nominal repetition. All English learners were able to identify and correct mistakes numbers 4 and 8, which contained the wrong use of a possessive or object pronoun instead of a possessive determinant. Participants were also able to easily identify and correct mistakes numbers 5 (67%), 9 (73%) and 10 (87%), which contained the wrong use of a demonstrative, a personal pronoun to take up a non-human antecedent, and a subject pronoun instead of a complement. The initial results of the asynchronous group were lower than those of the other groups. The maximum score was 100 per group, and while the control and the synchronous ones hit 55 and 57 questions

respectively, the asynchronous hit 51.

In the first part of the English pretest, no student noticed the mistakes numbers 1 and 3, of subject pronoun and unnecessary nominal repetition. All English learners were able to identify and correct mistakes numbers 4 and 8, which contained the wrong use of a possessive or object pronoun instead of a possessive determinant. Participants were also able to easily identify and correct mistakes numbers 5 (67%), 9 (73%) and 10 (87%), which contained the wrong use of a demonstrative, a personal pronoun to take up a non-human antecedent, and a subject pronoun instead of a complement. The initial results of the asynchronous group were lower than those of the other groups. The maximum score was 100 per group, and while the control and the synchronous ones hit 55 and 57 questions respectively, the asynchronous hit 51.

In general, Spanish students hit just under half of the pretest (39%), and English students hit just above (54%). Through Spearman's Correlation, a positive and moderate correlation was found between the results of the pretest and the proficiency test ($= 0.414$, $p = 0.005$), the self-assessment of reading ($= 0,418$, $p = 0.004$) and writing ($= 0.461$, $p = 0.001$) in the language of study, Task Value ($= 0.421$, $p = 0.004$) and Self-efficacy for Learning and Performance ($= 0.515$, $p < 0.001$). These correlations were also found in comparisons with the results of the posttests.

The Kruskal-Wallis test (KRUSKAL; WALLIS, 1952) identified the effect of the time spent studying the foreign language on the pretest results [$X^2(2) = 10.755$; $p = 0.013$], and the post-hoc test showed that this significant difference concerned groups that had studied the language for less or more than 3 years. Those who have been studying the language for more than three years have achieved better results in the pretest. There was, however, no significant difference between students in the third and fifth semesters of the course, and the effect of the time of study was no longer significant for the results of the posttests.

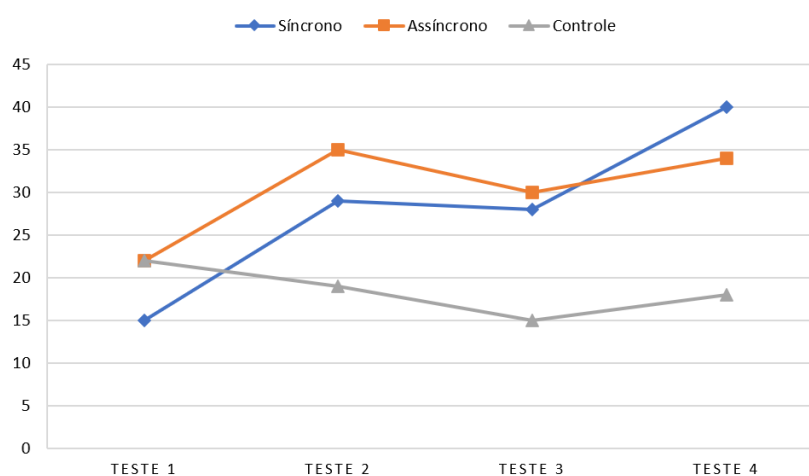Figures 3 and 4 compare the groups' results in the 4 tests.

Figure 3. Number of correct answers from Spanish groups.
Source: Own elaboration.

When analysing the learning progress in Spanish, the Friedman test (FRIEDMAN, 1940) showed that results differed between the 4 tests [$X^2(3) = 10,390$; $p = 0.016$], especially in questions 1 [$X^2(3) = 10.909$; $p = 0.012$], 2 [$X^2(3) = 18.600$; $p < 0.001$], 3 [$X^2(3) = 16.615$; $p = 0.001$], and 5 [$X^2(3) = 12.353$; $p = 0.006$]. The multiple comparison tests showed that the biggest difference was between tests 1 and 4. The experimental groups, unlike the control group, showed improvement in results, especially the synchronous group.

Friedman's test also showed that the English results differ between the 4 tests [$X^2(3) = 46.947$; $p < 0.001$], especially in questions 1 [$X^2(3) = 41.687$; $p < 0.001$], 3 [$X^2(3) = 32.690$; $p < 0.001$], and 7 [$X^2(3) = 21.923$; $p < 0.001$]. Multiple comparison tests proved that test 1 differed from tests 2, 3 and 4. Again, the experimental groups, unlike the control group, showed improvement in results.

Tables 7 and 8 show the distribution of errors in the four writing tests by number of students in each test. The most important mistakes found were the lack of pronouns, the use of wrong or
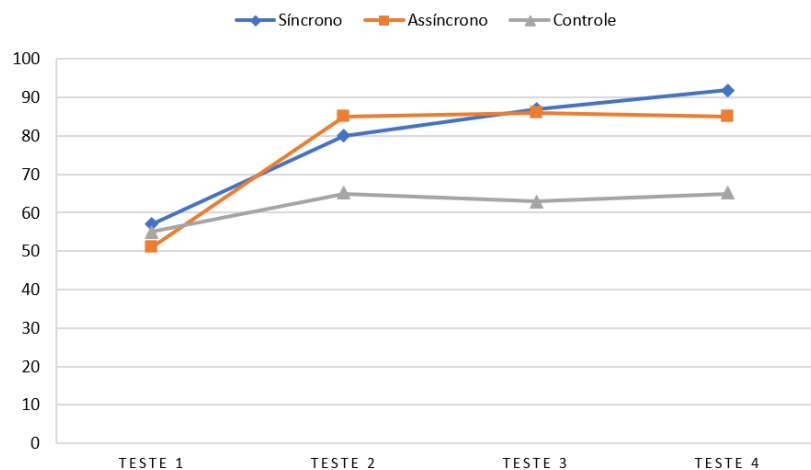
Figure 4. Number of correct answers from English groups.
Source: Own elaboration.

unnecessary pronouns, the creation of ambiguity, and excessive nominal repetition.

Table 7. Writing tests in Spanish.

	Synchronous (N=5)				Asynchronous (N=5)				Control (N=5)			
	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
Lack of pronoun	3	2	4	2	2	2	1	0	1	2	3	4
Wrong pronoun	3	4	2	2	2	3	0	3	1	4	3	3
Unnecessary pronoun	3	4	4	3	2	2	1	1	2	1	0	2
Ambiguity	0	0	0	1	0	1	0	0	0	2	0	1
Nominal repetition	5	4	4	5	5	3	2	5	5	5	5	5

Source: Own elaboration.

Table 8. Writing tests in English.

	Synchronous (N=10)				Asynchronous (N=10)				Control (N=10)			
	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
Lack of pronoun	1	3	0	2	0	5	4	1	1	2	1	3
Wrong pronoun	0	2	0	1	1	1	1	0	0	0	0	3
Unnecessary pronoun	0	1	0	0	1	1	2	1	1	1	2	1
Ambiguity	2	1	0	0	0	1	0	0	1	2	0	0
Nominal repetition	9	8	8	9	8	7	7	10	5	8	10	9

Source: Own elaboration.

Both Spanish and English students who participated in the experimental groups learned to identify and correct unnecessary pronouns and nominal repetitions in the first part of the tests. However, in the second part, which consisted of textual productions of 100 to 150 words, the set of errors found is very small and does not seem to allow for significant patterns in the evolution of the learning process. It should be noted, however, that almost all students have repeated the same nouns at least three times in their texts. Such behaviour was constant in all four tests. This can be interpreted as demonstrating that, although the course contributed to improving reading in a foreign language, it did not seem to have significantly contributed to improving writing.

At the end of the *Moodle* course page, students were able to anonymously evaluate the course and the teacher. Of the 30 experimental group participants, 19 sent their responses, of which 13 were from English and 6 from Spanish learners. Their feedback is analysed in Bruscato and Baptista (2020a) and, in general, students' perception of the course was very positive. One student from each language, however, would have liked the tests to have been of different text genres, so that they could

better practice what they learned. Nonetheless, it was decided to use the same genre for all the tests so this would not become a possible variable in the analysis of the results.

Through the teacher's subsequent analysis of the classes, it was noticed that there was a better interaction between participants in the Spanish synchronous group, which had 5 students, and in the English asynchronous group, which had 10. With a smaller group, everyone can see and speak to one another during the lesson. With a larger group, the written debates on the forums seem to be more fruitful.

6 Conclusion

As it was seen in the literature review, little research has been done on the impact of learning modalities and individual student characteristics on learning anaphoric processes in a foreign language. However, since anaphora is one of the mechanisms responsible for textual cohesion and is considered a sign of speakers' communicative competence, studies focusing on this discursive mechanism are relevant for language teaching.

This article presented the results of an experimental study on the learning of anaphora in English and Spanish. It aimed to answer how learning outcomes can be affected by the distance learning modality (Q1), the foreign language studied (Q2), the assessment of reading or writing (Q3), the level of proficiency in the foreign languages (Q4), and the participants' degree of motivation (Q5). Thus, an online course was offered as intervention to Modern Language students at a Brazilian university in the first semester of 2020. The research included 1 initial questionnaire, 2 lessons of 90 minutes each, and 4 written tests. Data from three groups were compared: one that had synchronous lessons on the topic; one that had asynchronous lessons; and another that had no lessons, serving only as a control group.

A positive and moderate correlation between the learners' proficiency in the foreign language and their knowledge of anaphora was identified in this study, as it was previously observed by Pretorius (2005). In the learner corpus compiled for the research, it was perceived that students do not usually make errors of anaphoric ambiguity but make excessive use of nominal repetition, confirming what was found in Lozano (2016).

In the first part of the pretest, which contained 10 errors of different types to assess reading, no English student noticed errors number 1 and 3, of unnecessary subject pronoun and nominal repetition, and few Spanish students noticed them (40% and 20%, respectively). In the final test, almost all students in the experimental groups got right questions 1 (90%) and 3 (90% Spanish and 80% English). Although they noticed and corrected the excessive nominal repetition in the reading tests, they did not do the same in their writing (second part of each test).

Through the analysis of the tests, it has been possible to answer the research questions (Q) raised here. A positive and moderate correlation was identified between the students' knowledge of anaphora, level of proficiency (Q4), and degree of motivation to study the language (Q5), more specifically the constructs Task Value and Self-efficacy for Learning and Performance. These correlations were noticed in the four tests, in which students with the highest general knowledge of the language and the highest motivation to study it showed the best results.

English students demonstrated a greater prior knowledge of anaphora than Spanish students (Q2), probably because they have been studying it for longer than the others; and they also presented the best results on the tests, reaching the final score above 80% on the reading test. Although the experimental groups showed improvement in the reading tests, the same did not happen with writing (Q3). A better progress in learning was identified in the synchronous groups (Q1), which achieved the highest scores on the final test (80% and 92%), but the difference with the asynchronous groups was not significant ($p < 0.05$).

Although both distance learning modalities seem to be equally effective for students' learning, they have different requirements. For synchronous learning, it is necessary to connect a professor and a group at the same time, and it is better to have smaller groups to improve communication. For asynchronous learning, a professor must initially prepare many study materials and activities, but a tutor can track students' progress and answer students' questions. For institutions, asynchronous

learning seems economically the best option. However, synchronous learning offers a contact between students and professors that is more similar to face-to-face interaction.

This study contributes to the field by considering multiple variables to analyse the effectiveness of distance learning modalities. However, it has some limitations. The course only had two lessons, which did not seem enough to improve writing in the foreign language. Furthermore, there was a small number of participants: only 15 Spanish students and 30 English students. For the continuity of the work, it is intended to replicate the research in Portugal to compare the results and consider the native language variety and the educational context as other possible variables.

Acknowledgements

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