The role of lexico-syntactic features in noun phrase production and comprehension: insights from Spanish and Chinese in unilingual and bilingual contexts

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Chapter 5

Classifier Assignment Strategies in Mixed Chinese–Spanish Noun Phrases: Insights from a Multilingual Community in Barcelona

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Abstract

This study investigates how early Spanish–Chinese bilinguals assign Mandarin Chinese classifiers to Spanish nouns in mixed Chinese–Spanish noun phrases (NPs). Mandarin Chinese compulsorily uses classifiers in NPs, with most of them being selected largely based on the semantic properties of associated nouns. In contrast, Spanish does not have a classifier system. While Chinese employs several dozen classifiers, the general classifier *ge* is used as a default, raising the question of whether bilinguals will similarly default to *ge* when assigning classifiers to Spanish nouns, or whether they will employ other strategies, such as selecting classifiers based on Chinese translation equivalents of the noun. To address these questions, we adopted a multi-method approach, including a director-matcher task, a sentence repetition task, and a judgment task, with thirty early Spanish–Chinese bilinguals, heritage speakers of Chinese residing in Barcelona, Spain, in unilingual Chinese NPs and mixed NPs. Results showed that, in unilingual Chinese NPs, bilinguals reliably used the expected-specific classifiers in both production and comprehension. However, in mixed NPs, while both the general classifier *ge* and expected-specific classifiers were used in production, comprehension was overwhelmingly guided by expected-specific classifiers. These findings flexibly utilize both default and translation equivalent strategies in classifier assignment. This parallels previously observed gender assignment strategies in the same bilingual community, highlighting the role of community characteristics and social networks in shaping code-switching. This is the first study to explore classifier assignment in mixed Chinese–Spanish NPs, offering novel insight into bilingual flexibility and adaptability in navigating multiple linguistic systems. While these findings provide valuable initial evidence, additional research will help determine their applicability across broader populations and contexts.

Keywords: code-switching; mixed noun phrases; Chinese classifiers; Chinese; Spanish; bilingualism

5.1 Introduction

A unique feature of multilingual communication is that speakers fluently alternate or integrate elements from their languages into one single conversation, a practice known as code-switching (CS) (Poplack, 1980). In CS research, mixed noun phrases (NPs) have emerged as a key area of interest, where one element (e.g., determiners or articles) belongs to one language, while other elements (e.g., nouns or adjectives) come from the other. This interest likely stems from the frequent code-switches observed between determiners and the adjective-noun cluster within mixed NPs in naturalistic data (e.g., Parafita Couto & Gullberg, 2019). For instance, Spanish–English bilinguals might produce *los dry walls* ([the$_{\text{PL.MASC}}$ dry walls] "the dry walls"), combining a Spanish determiner (*los*) with an English adjective-noun cluster (*dry walls*) (Parafita Couto & Gullberg, 2019). Research on these mixed determiner-NPs has predominantly focused on grammatical gender assignment in language combinations that are either both gender-marked or consist of one gender-marked and one non-gender-marked language (see Bellamy & Parafita Couto, 2022 for an overview). This has well established the patterns of gender assignment and the corresponding gender assignment strategies used in mixed NPs across various language combinations and bi/multilingual communities (see Wu et al., 2025 for gender assignment in mixed Spanish–Chinese NPs). It is known that exploring the mechanisms of gender assignment in mixed NPs enhances our understanding of how bilingual speakers navigate linguistic structure differences and integrate elements from their languages. However, grammatical gender is only one type of nominal classification system. To develop a more comprehensive understanding of how bilinguals process such systems across languages, it is crucial to expand such research to include language combinations that do not encode grammatical gender but have analogous systems, such as classifiers. One such language combination that deserves attention is mixed Chinese–Spanish classifier-NPs.

Nominal classification systems are a prevalent feature across the world's languages, with grammatical gender (e.g., Spanish) and numeral classifiers (e.g., Mandarin Chinese) representing the most widespread types (Seifart, 2010). In Spanish, every noun is inherently assigned a grammatical gender, either masculine or feminine, with masculine functioning as the default (Harris, 1991; Roca, 1989). Determiners and adjectives within Spanish NPs do not possess inherent gender but instead agree in gender with associated nouns (Harris, 1991). Thus, grammatical gender in Spanish is determined by the properties of nouns. Similarly, Mandarin Chinese features a lexico-syntactic numeral classifier system in which specific morphemes, known as "classifiers", are obligatorily positioned between numerals or demonstratives and nouns within NPs, for example, 一辆汽车, /yi1liang4qi4che2/ [one + classifier-liang4 + car], "one car" (Li & Thompson, 1981). Similar to grammatical gender in Spanish, classifier selection in Chinese largely depends on the particular semantic properties of nouns (Li & Thompson, 1981). Given that both grammatical gender and classifier systems organize nouns into categories based on intrinsic properties, mixed Chinese–Spanish classifier noun phrases present a good context for investigating how bilinguals manage structural differences and integrate elements from both languages during code-switching (see Parafita Couto et al., in press). Accordingly, this study examines classifier assignment patterns and strategies in mixed Chinese–Spanish NPs within an underexplored bilingual community. To our knowledge, limited code-switching research has addressed this phenomenon among early Spanish–Chinese bilinguals in Barcelona. Specifically, we analyze which Chinese classifiers are selected for Spanish nouns and identify the strategies these bilinguals employ in classifier assignment within mixed NPs.

5.2 Research background

5.2.1 Classifiers in Mandarin Chinese and mixed Chinese –Spanish NPs

5.2.1.1 Classifiers in Mandarin Chinese

In Mandarin Chinese (hereafter, "Chinese" refers to Mandarin Chinese), there are a multitude of classifiers employed in a variety of contexts. The 1988 edition of the *Hanyu Liangci Cidian* (*A Dictionary of Chinese Classifiers*, 1988) lists a total of 902 classifiers[7]. These include both nominal classifiers (cf. *名量词 "mingliang ci"* in Chinese), paired with nouns in NPs, and verb classifiers (cf. *动量词 "dongliang ci"* in Chinese), paired with verbs in verb phrases (Zhang, 2007). Considering that this study focuses on NPs, only nominal classifiers (hereafter, "classifier" refers to nominal classifiers) are described in detail.

Erbaugh (1986) notes that approximately 150 classifiers are commonly used in Chinese. The categorization of these classifiers varies across studies, with different scholars proposing overlapping classification schemes. For instance, Chao (1968) delineates six major categories: (1) individual classifiers to classify individual objects based on their shape or other properties (e.g., *棵* /ke1/ "classifier for plants"); (2) group classifiers to group or represent collections of individual objects (e.g., *捆* /kun3/ "bundle"); (3) partition classifiers, which represent portions of objects (e.g., *一截绳子* /yi1jie2sheng2zi0/ "a section of rope"); (4) temporary classifiers, measuring entities by external extent (e.g., *一身雪* /yi1shen1 xue3/ "a bodyful of snow"); (5) standard measure classifiers, i.e., measure weight or length (e.g., *公里* /gong1li3/ "kilometer"); (6) container classi-

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[7] Earlier research did not clearly differentiate between the terms "classifier" and "measure word", instead, they were often used interchangeably or subsumed under one another. For example, Chao (1968) referred to all Chinese classifiers as "measure words". In contrast, Erbaugh (2006) adopted the term "classifier" but mentioned that the Chinese word for classifier is literally "measure word" (*量词, "liangci" in Chinese*). However, Li and Thompson (1981) used both terms, treating "measure words" as a subset of "classifiers" and stating that any measure word can be a classifier. In this paper, we will not focus on distinguishing these terms but instead consistently use "classifier".

fiers, i.e., container nouns used as measures (e.g., *一瓶水* /yi1ping2shui3/ "a bottle of water"). These categories reflect the diverse functions and semantic criteria underlying classifier selection in Chinese.

Based on similar criteria, Erbaugh (1986) categorized five groups: (1) sortal classifiers, which are based on the properties of entities (e.g., *棵* /ke1/); (2) collective classifiers, i.e., indicate arrangements of entities (e.g., *捆* /kun3/); (3) event classifiers, measuring events (e.g., *场* /chang3/ "performance of a show"); (4) kind classifiers, which refer to the kind or type of entities, e,g., *种* /zhong3/ "type"; (5) measure classifiers, measuring weight or length (e.g., *公里* /gong1li3/). Among these categories, sortal classifiers as described by Erbaugh (1986) and individual classifiers as outlined by Chao (1968) are the most frequently used and tend to show considerable overlap in their classification criteria. These classifiers are typically associated with nouns that are countable and are the preferred choice of monolingual Chinese speakers when referring to unfamiliar nouns or introducing new information (Erbaugh, 2006). Therefore, this study focuses on the use of sortal (individual) classifiers within the Chinese classifier system.

In Chinese, there are approximately 75 sortal classifiers, with each typically associated with 5 to 20 nouns (Erbaugh, 2002). Typically, in Chinese NPs, these classifiers must occur after a numeral (e.g., *yi1* "one", *ban4* "half"), a demonstrative (e.g., *zhe4* "this", *na*4 "that"), and/or quantifiers (e.g., *zheng3* "whole", *ji3* "a few"), but precede the noun, i.e., "numeral/demonstrative/quantifiers + classifier + noun" (Li & Thompson, 1981). The selection of classifiers is largely determined by the semantic properties of nouns, including animacy, shape, function, and size (Myers & Tsay, 2000). For instance, the classifier *tiao* can be shared by both *蛇* /she2/ "snake" and *绳子* /sheng2zi0/ "rope" due to the fact that they both have a long shape. While these semantic features play significant roles in classifier choices within NPs, the relationship between nouns and their corresponding classifiers is not always transparent (Shao, 1993; Tzeng et al., 1991; also see Wang & Schiller, in press, and Qian, in press, for an overview). In many cases, the "proper"[8] classifier for a given noun must be learned through rote memorization. Additionally, it is not always the case that each noun corresponds to a single, fixed classifier; rather, speakers frequently use multiple classifiers with the same noun (Erbaugh, 2006). For example, classifiers include 只 (*zhi1*, "for animals or small objects"), 条 (*tiao2*, "extended, long shape"), 头 (*tou2*, "head"), and 角 (*jiao3*, "horn") were used for the referent "goat" in the Pear Stories film by one single speaker, which was also acceptable (Erbaugh, 2006). Lakoff (1987) argued that classifiers are a form of conceptual category, which reflects the imaginative aspects of the mind. Denny (1976) also suggested that the selection of classifiers for nouns is more likely to emphasize the inherent properties of the objects themselves. Nevertheless, Chinese speakers are likely to share a common sense of which classifier categories are suitable for categorizing objects overall (Allan, 1977).

In addition to specific sortal classifiers, there is an exception to classifiers, a so-called *general* or *default* classifier (Myers & Tsay, 2000). In Chinese, the most frequently used classifier is *ge* (个 /ge4/), which is gradually becoming a general (Li & Thompson, 1981) and default classifier (Myers & Tsay, 2000). On the one hand, the general classifier *ge* is typically used for nouns that do not fit into any particular or specialized classifier category (Erbaugh, 1986), with approximately 40% of nouns only take this classifier, including unique objects (e.g., "earth", "city"), abstractions (e.g., "dream", "idea"), and many common objects (e.g., "ball") (Erbaugh, 2006). On the other hand, it has a function as a default to substitute for sortal classifiers or to be used for nouns that do not take a sortal classifier (Aikhenvald, 2000). Thus, it possesses considerable grammatical flexibility and can be used in a wide range of contexts, which allows it to replace a more specialized classifier in many cases (Li & Thompson, 1981; Zhang, 2013). For example, 1a and 1b, the proper classifiers for 1a and 1b are *ke*

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[8] In this article, we consistently use the term "proper" as in Li and Thompson (1981) to refer to the classifier that is most associated with the noun they accompany.

and *tiao*, respectively. However, many monolingual Mandarin Chinese speakers have replaced *ke* and *tiao* with the general classifier *ge*. For these speakers, both the general classifier *ge* and the proper classifiers *ke* and *tiao* are equally acceptable.

1. a. san *ge/ke* xigua
three $CL_{general}$/$CL_{specific}$ watermelon
"three watermelons"

b. san *ge/tiao* jianyi
three $CL_{general}$/$CL_{specific}$ suggestion
"three suggestions"

(Zhang, 2013)

However, the alternation of *ge* and other classifiers does not always happen on the basis of the acceptability of grammaticality. In fact, many nouns still require a specific classifier that should be memorized (Li & Thompson, 1981). For example, classifiers in NPs that include kind classifiers (2a) or non-abstract mass nouns (2b) cannot be replaced by *ge*.

2. a. san *zhong* shu
three $CL_{kind\text{-}specific}$ book
"three kinds of books"

b. san *di* you
three $CL_{specific\text{-}mass}$ oil
"three drops of oil"

(Zhang, 2013)

In general, the classifier *ge* is the *default* classifier that can replace any other classifiers under the right pragmatic conditions (Myers & Tsay, 2000). The use of the general classifier *ge* as a default is commonly observed in the speech of monolingual Chinese adults (e.g., Erbaugh, 1986; Myers et al., 1999), children (e.g., Erbaugh, 1986; Hu, 1993), and non-native Chinese learners (Polio, 1994). For instance, Myers et al. (1999) found that monolingual Chinese adult speakers used the classifier *ge* approximately 70% of the time in a classifier elicitation study. A similar pattern was found in the storytelling study in Erbaugh (1986), in which the classifier *ge* was used almost 95% of the time. Based on these findings, it is interesting to explore how Spanish–Chinese bilingual speakers use the general classifier *ge* and specific proper classifiers in both Chinese unilingual contexts and Chinese–Spanish bilingual contexts. In other words, it becomes imperative to employ multiple tasks to investigate whether the classifier *ge* is the default when early Spanish–Chinese bilinguals process and produce classifier-NPs in unilingual Chinese and Chinese–Spanish bilingual contexts.

5.2.1.2 Classifiers in mixed Chinese–Spanish NPs

Typically, mixed Chinese–Spanish NPs consist of at least a Chinese numeral, followed by a Chinese classifier, and a Spanish noun (i.e., Chinese numeral + Chinese classifier + Spanish noun, see examples 3a and 3b below with Spanish nouns in italics).

3. a. 一 朵 *flor*
   one CL.duo$_{\text{specific}}$ flower
   "one flower"

   b. 一 辆 *coche*
   one CL.liang$_{\text{specific}}$ car
   "one car"

Given that Chinese has several dozen classifiers that can or cannot be assigned based on the semantic properties of nouns, as well as the exception of the general classifier *ge*, this raises questions: how do Spanish–Chinese bilinguals assign Chinese classifiers to Spanish nouns in mixed Chinese–Spanish NPs? Do they default to the general classifier *ge* for Spanish nouns? Research on grammatical gender, a comparable classification system to the classifier system in Chinese, in many mixed-language contexts has documented several strategies, such as defaulting other-language nouns to masculine gender or assigning gender to other-language nouns based on the gender of Spanish translation equivalents (see section 5.2.2). Considering the parallel noun-based nature of both grammatical gender and classifier systems, this study investigates whether similar strategies are employed in classifier assignment within mixed Chinese–Spanish NPs. To provide some context for this exploration, the following section first reviews gender assignment strategies in mixed NPs and then draws on these findings to hypothesize analogous strategies for classifiers.

5.2.2 Classifier assignment strategies

5.2.2.1 Default strategy

The default strategy was introduced by Poplack et al. (1982) and elaborated in subsequent studies (for an overview, see Bellamy & Parafita Couto, 2022) to explain gender assignment patterns in mixed NPs. In studies of gender assignment, this strategy refers to preferences for defaulting to a gender for most other-language inserted nouns, regardless of the gender of their translation equivalents, semantic or morpho-phonological properties (see Bellamy & Parafita Couto, 2022). For example, Spanish–English bilinguals in Miami default Spanish masculine gender to English nouns and produce *el cookie* "the$_{\text{MASC}}$ cookie", rather than *la cookie* "the$_{\text{FEM}}$ cookie", although the Spanish equivalent *galleta* is feminine (see Valdés Kroff, 2016). Similarly, Chinese includes the general classifier *ge*, which often functions as a default choice, particularly when speakers refer to nouns that do not fit neatly into specific categories or when concepts are unfamiliar (see Myers & Tsay, 2000 and Erbaugh, 2006). This pattern allows us to hypothesize a comparable default strategy for classifier assignment in mixed Chinese–Spanish NPs. Under this approach, Spanish–Chinese bilinguals might regularly use *ge* for Spanish nouns, regardless of whether a more specific proper classifier exists for their Chinese equivalents or based on semantic properties. For example, Spanish–Chinese bilinguals would produce 一个 *árbol*, [one + general classifier-ge4 + tree], "one tree", rather than 一棵 *árbol*, [one + specific-proper classifier-ke1 + tree], "one tree", although the classifier 棵 /ke1/ is specific for nouns related to plants.

5.2.2.2 Translation equivalent strategy

The translation equivalent strategy, also referred to as analogical criterion (Liceras et al., 2008) or analogical gender (Montes-Alcalá & Lapidus Shin, 2011), is commonly associated with assigning gender to inserted nouns in mixed NPs based on the gender of their translation equivalents in the recipient language (for an overview, see Bellamy & Parafita Couto, 2022). For example, Spanish–English bilinguals produced *la party* "the$_{\text{FEM}}$ party", aligning with the feminine gender of its Spanish translation equivalent *fiesta,* although *party* has no grammatical gender in English (see López, 2020). By analogy, we propose a translation equivalent strategy for classifier assignment in mixed Chinese–Spanish NPs. According to this approach, Spanish–Chinese bilinguals would select the specific proper classifier that corresponds to the Chinese translation equivalent of the inserted Spanish noun. For instance, bilinguals would produce *一把 tenedor,* [one + specific-proper classifier-ba3 + fork], "one fork", based on its Chinese equivalent *叉子* /cha1zi0/ that matches with the specific classifier *把* /ba3/ (i.e., commonly used for objects with handles).

5.2.3 Spanish–Chinese bilingual community in Spain

To explore how classifiers are assigned in bilingual contexts, this study focuses on the Spanish–Chinese bilingual community in Barcelona, a linguistically rich and dynamic population shaped by sustained contact between typologically distinct languages and offering valuable insights into cross-linguistic influence and code-switching. This community has grown significantly over recent decades: since the 1980s, a major wave of Chinese migration has taken place (Beltrán Antolín & López, 2013), making the Chinese population the second-largest non-EU immigrant group in Spain since 2016 (Robles-Llana, 2018). Between 2003 and 2020, the number of Chinese residents rose from 13,416 to over 56,000, with the population of children under 16 increasing from 2,400 to more than 12,000 (He, 2024). This growth of the second generation has led to the emergence of a relatively young but increasingly stable Spanish–Chinese bilingual community. In this community, most first-generation immigrants share a common regional origin, occupational background (e.g., family-run businesses), limited educational background, and strong ties to Chinese cultural traditions (Beltrán Antolín, 2008). These conditions have fostered a cohesive and homogeneous community environment that supports Chinese heritage language transmission.

Moreover, second generations often serve as linguistic and cultural mediators within and beyond the community, a role necessitated by their parents' limited integration into broader Spanish society (Robles-Llana, 2018). This dynamic has resulted in second generations developing proficiency in Chinese alongside dominant exposure to Spanish (and often Catalan) through schooling and broader societal interaction. In addition, growing up in a multilingual environment exposed these heritage speakers to regular interactions with Chinese and Spanish monolinguals, Spanish–Chinese bilinguals, Catalan–Spanish bilinguals, and other bi/multilinguals. This environment fosters rich cross-linguistic contact and encourages flexible, adaptive language practices, such as frequent intra-clausal code-switching and the dynamic management of typologically distinct language systems. Despite being a relatively young community, Spanish–Chinese bilinguals in Barcelona demonstrate vibrant use of both Spanish and Chinese, making this context especially valuable for examining how bilinguals navigate and manage their languages, as well as their code-switching patterns.

5.3 The current study

5.3.1 Research questions

In this study, we investigate code-switching patterns involving classifiers in mixed Chinese–Spanish NPs with an understudied bilingual population. Given that Chinese features several dozen classifiers and a default classifier *ge*, we thus focus on examining how early Spanish–Chinese bilinguals, heritage speakers in Barcelona, Spain, use Chinese classifiers in mixed Chinese–Spanish NPs. Based on this, we further identify which classifier assignment strategies they prefer in mixed NPs. Thus, three main research questions are addressed:

1. Do early Spanish–Chinese bilinguals default to the classifier *ge* when producing Spanish nouns within mixed Chinese–Spanish NPs?
2. To what extent do the classifier patterns in mixed Chinese–Spanish NPs align with those observed in unilingual Chinese NPs?
3. What classifier assignment strategies do early Spanish–Chinese bilinguals employ in the production and comprehension of mixed Chinese–Spanish NPs?

5.3.2 Hypotheses

Building on the findings from Chapter 3, which showed that early Spanish–Chinese bilinguals flexibly adopted different gender assignment strategies depending on task type and the sociolinguistic characteristics of their community, we hypothesize that similar patterns will emerge for classifier assignment in mixed Chinese–Spanish NPs.

1. We predict that bilingual speakers will not uniformly default to the general classifier *ge* when producing Spanish nouns in mixed NPs. Instead, they are expected to alternate between general *ge* and expected-specific classifiers, reflecting their flexibility in processing classifiers and the influence of their existing Chinese classifier knowledge.
2. We predict that classifier assignment patterns in mixed Chinese–Spanish noun phrases will diverge from those observed in unilingual Chinese contexts, showing adaptations to cross-linguistic influences and bilingual language mode.
3. We expect that bilinguals' classifier choices will vary across production and comprehension tasks, with a greater tendency to use specific classifiers in comprehension, where metalinguistic awareness is more activated, and a relatively balanced use of *ge* and specific classifiers in production, consistent with patterns of task-dependent language

processing observed in Chapter 3. Specifically, we predict bilinguals will employ both default and translation equivalent strategies in production, while they will prefer translation equivalent strategies in comprehension.

5.4 Methods

5.4.1 Participants

Thirty early Spanish–Chinese bilinguals (M_{age} = 20.5 years, SD_{age} = 1.66 years, 20 females) from Barcelona (Spain) participated in this study (see Table 5.4.1). Of these, 26.67% (n = 8) reported having lived in Spain only, while the remaining 73.33% (n = 22) had lived in both Spain and China. Notably, one participant from the group was born in France and moved to Spain, and one participant was born in Italy, lived in China for four years, and then moved to Spain. Overall, most participants were born either in Spain or China and currently live in Spain. All participants were raised in Chinese heritage families, with all family members of Chinese nationality. They learned Chinese at home or at language schools, and acquired Spanish with an average age of 3.47 years (*SD* = 3.42) in educational contexts in Spain. All participants filled in a background questionnaire adapted from the Bilingual Code-Switching Profile (BCSP) (Olson, 2022) to gain insight into their language profile. Moreover, they reported their daily language of Chinese ($Frequency_{mean}$ = 40.7%, $Frequency_{SD}$ = 0.17), Spanish ($Frequency_{mean}$ = 41.9%, $Frequency_{SD}$ = 0.156), Catalan ($Frequency_{mean}$ = 9.12%, $Frequency_{SD}$ = 0.059), and English ($Frequency_{mean}$ = 6.18%, $Frequency_{SD}$ = 0.053). All participants voluntarily participated in the study and completed two production and one comprehension tasks in CS mode and unilingual Chinese mode sequentially. Participants received monetary compensation after the completion of all tasks. All related materials, including stimulus lists for three tasks and the results for the questionnaire and three tasks, can be found on the OSF.

Table 5.4.1. Participant characteristics in Experiments 1, 2, and 3.

	Experiments 1, 2, and 3
Number of Female/Male participants	20/10
Mean age in years (SD; range)	20.5 (1.66;18-24)
Number of participants born in Spain/Italy/France	18/1/1
Number of participants born in China	10
Age of Chinese acquisition	After birth
Age of Spanish acquisition	3.47 years (*SD* = 3.42)
Daily use of Chinese (frequency)	40.7% (*SD* = 0.170)
Daily use of Spanish (frequency)	41.9% (*SD* = 0.156)
Daily use of Catalan (frequency)	9.12% (*SD* = 0.059)
Daily use of English (frequency)	6.18% (*SD* = 0.053)
Participants with living experience in China (i.e., more than one year)	22

5.4.2 Production tasks

5.4.2.1 Experiment 1: Director-Matcher task (Toy task)

Materials

Thirty-two colored pictures were obtained from the Multipic database (Duñabeitia et al., 2018) based on five criteria: 1) objects on pictures should relate to count nouns with non-abstract concepts; 2) each object should relate to only one Chinese name and one corresponding Spanish translation equivalent; 3) objects should associate predominantly with only one proper specific classifier based on *Xiandai Hanyu Liangci Yongfa Cidian* (*A Dictionary of Modern Chinese Classifier Usage,* Guo, 2002); 4) no more than two objects associated with the same classifier; 5) the general classifier *ge* is grammatically acceptable for all objects. In addition to consulting the dictionary to ensure the accurate use of classifiers for each object, the most proper classifiers were also determined based on consensus among ten native Chinese PhD students in linguistics, who filled out the classifier they considered most proper for each object. Consequently, 32 target pictures were selected, each with a concrete concept and a corresponding proper classifier. Hereafter, we refer to the proper classifiers, identified through native speaker consensus and dictionary consultation, as *expected-specific classifiers*. Given that the relationship between nouns and their corresponding classifiers is not always transparent and that speakers often use multiple classifiers for the same noun (see Section 5.2.1.1), if participants produced a specific classifier that differed from the expected one for a given noun, we label those as *unexpected-specific classifiers*.

Procedure

Participants completed the toy task in pairs. First, participants were presented with the 32 target pictures and learned the exact Chinese name and Spanish equivalent of each picture for 3 seconds. Then, they sat opposite each other at a table with a hardboard between them. They were randomly assigned a role as either "director" or "matcher" to complete the task. Last, they were presented with two separate grids of blank space, on which the same 32 target pictures were displayed at different positions (see Figure 5.4.1).

The toy task was completed sequentially in CS mode and unilingual Chinese mode. In each mode, participants followed the same procedures. First, printed instructions were provided in CS mode for the CS task and in unilingual Chinese for the unilingual task. Second, the "director" described each picture in sequence, including information such as name, color, shape, and position, to the "matcher". The "matcher" then moved the corresponding picture to a specified position based on the description. Third, the "matcher" verified details of each picture with the "director" once the descriptions were complete. In the CS mode, "director" and "matcher" were always asked to complete the task in Chinese while naming pictures in Spanish. In the unilingual Chinese mode, descriptions of pictures were only in Chinese. All participants completed the toy task in CS mode prior to doing so in unilingual Chinese mode. Target NPs are as follows (see examples 4 and 5), with the Spanish noun in italics.

4. 一 面/个 *espejo* [mixed NP]
one CL.mian$_{specific}$/ CL.ge$_{default}$ mirror
"a mirror" (cf. 一面镜子)

5. 一 架/个 钢琴 [unilingual Chinese NPs]
one CL.jia$_{specific}$/CL.ge$_{default}$ piano
"a piano"

Figure 5.4.1. Illustration of the toy task setup.

5.4.2.2 Experiment 2: Repetition task

Materials

In this task, Chinese names and their Spanish equivalents for the 32 colored pictures used in the director-matcher task served as target nouns in unilingual Chinese NPs and mixed Chinese–Spanish NPs, respectively.

Thirty-two unilingual Chinese sentences were initially selected and generated based on the BCC corpus (Xun et al., 2016), each comprising a unilingual Chinese NP composed of a Chinese noun referring to the name of each picture.

Unilingual mode: In unilingual mode, the original 32 unilingual Chinese sentences were modified to reflect classifier comparisons regarding expected-specific classifiers and general classifier *ge* within unilingual NPs. Thus, 64 unilingual Chinese sentences with different classifiers were obtained.

CS mode: In CS mode, target Chinese nouns within unilingual Chinese NPs in the 32 unilingual sentences were replaced by their Spanish equivalents, resulting in 32 CS sentences featuring 32 mixed Chinese–Spanish NPs (i.e., Chinese numeral + expected-specific classifiers + Spanish nouns). These sentences were then modified by replacing expected-specific classifiers with the general classifier *ge*, resulting in 32 comparison sentences. Thus, a total of 64 CS sentences were constructed, with the contrast of sentence pairs being the classifiers (i.e., expected-specific classifiers vs. general classifier *ge*). To eliminate the potential impact of the NP position, the placement of NPs in each sentence was counterbalanced in each mode. Consequently, NPs at the beginning (11) (see Example 6), in the middle (11) (Example 7), and at the end (10) (Example 8) of 32 CS and 32 unilingual Chinese comparison sentences were identified.

6. CS sentences with mixed Chinese–Spanish NPs:

一支/个 lápiz 和一些纸就能让他画出世界万物，而且画得惟妙惟肖，栩栩如生.

Unilingual Chinese sentence:

一支/个铅笔和一些纸就能让他画出世界万物，而且画得惟妙惟肖，栩栩如生.

"***A pencil*** and some paper allowed him to draw everything in the world, and to do so in a beautiful, lifelike way."

7. CS sentences with mixed Chinese–Spanish NPs:

   我看到天空中飘着***一朵/个 nube***，乍一看，还以为是个小山包.

   Unilingual Chinese sentence:

   我看到天空中飘着***一朵/个云***，乍一看，还以为是个小山包.

   "I saw ***a cloud*** in the sky that, at first glance, looked like a small hill."

8. CS sentences with mixed Chinese–Spanish NPs:

   直升机开始在空中摇晃，然后坠入树林中，撞上了***一棵/个 arbol.***

   Unilingual Chinese sentence:

   直升机开始在空中摇晃，然后坠入树林中，撞上了***一棵/个树***.

   "The helicopter began to shake in the air, then crashed into the woods and hit ***a tree***."

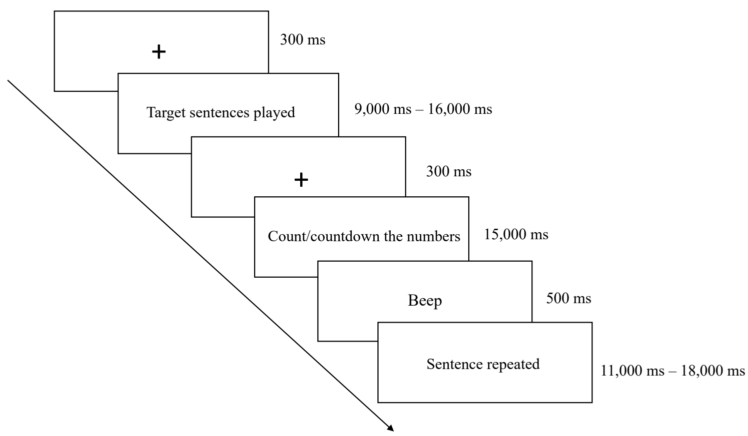
Procedure

The repetition task was programmed in E-prime 2.0 software (Schneider et al., 2002) with a by-subject order design, whereby the order of both the blocks and sentences was randomized across participants. Each participant completed this task in CS mode and unilingual Chinese mode sequentially and individually. In all instances, the CS mode is always completed prior to those in the unilingual Chinese mode. For each participant, the procedure in both CS mode and unilingual Chinese mode was as follows (see also Figure 5.4.2).

CS mode: First, each participant sat in front of a screen and was provided with instructions in CS mode, instructing them to listen to and repeat 64 CS sentences. Second, each participant saw a fixation cross on the screen for 300 ms, and then heard a CS sentence. Each sentence was played only once, and participants were instructed to repeat it as much as possible in a manner and tempo that was natural to them. Third, another fixation cross was presented for 500 ms, and participants were then instructed to count from ten to twenty or down from twenty to ten in their preferred language for 15 seconds. This intervening task was designed to prevent rote memorization and instead elicit responses that reflect participants' underlying grammatical knowledge, particularly when repetition exceeded their capacity of short-term memory (Gullberg et al., 2009). Fourth, a beep sound was played for 500 ms as a prompt, after which participants repeated each sentence within a specified time range (11–18 seconds) based on the length of each sentence. Participants' vocal responses were automatically recorded.

Unilingual mode: In the unilingual mode, participants read unilingual Chinese instructions and repeated 64 unilingual Chinese sentences sequentially. They followed the same experimental procedure as in the CS mode.

Figure 5.4.2. Example trial procedure in the repetition task.



5.4.3 Comprehension task

5.4.3.1 Experiment 3: Acceptability judgment using a two-alternative forced-choice task (2AFC judgment task)

Materials

***Critical sentences*:** 64 CS sentences containing mixed Chinese–Spanish NPs and 64 unilingual Chinese sentences comprising unilingual Chinese NPs were generated by following the same procedure as in the repetition task. Each sentence pair was compared regarding the use of classifiers within NPs, i.e., the general classifier *ge* vs. expected-specific classifiers. The location of the NPs in each sentence was counterbalanced in each mode, with the NPs occurring at the beginning (10), middle (11), or end (11) of the sentence.

***Filler sentences*:** a total of 72 CS filler sentences were constructed, comprising 36 in Spanish with either inserted Chinese nouns or adjectives and 36 in Chinese with either inserted Spanish nouns or adjectives. Additionally, 36 filler unilingual sentences were created, including 18 in unilingual Spanish and 18 in unilingual Chinese. Sentences were presented in pairs, with the contrast between each sentence pair being the placement of adjectives, either pre-nominal or post-nominal, in the NPs. The outcomes of these filler sentences fall outside the scope of the present study and will be reported in other studies.

Procedure

This experiment was conducted online using Qualtrics (Qualtrics, LLC, Provo, UT, USA). In this task, participants chose either the expected-specific classifier or the general classifier *ge* to accompany the Spanish noun in a CS sentence or to accompany the Chinese noun in a unilingual Chinese sentence. Critical and filler sentences, presented in the same language mode, were randomized across participants. In each mode, participants read sentence pairs sequentially and made selections before proceeding to the next. Notably, participants always completed this task in CS mode before proceeding to the unilingual Chinese mode.

5.5 Results and analysis

All recorded NPs were initially transcribed, and those containing at least a Chinese classifier with a Spanish noun (in CS mode) or with a Chinese noun (in unilingual Chinese mode) were extracted and proceeded for further analysis. In unilingual mode, production and comprehension data were analyzed descriptively, as participants consistently exhibited a clear-cut preference for expected-specific classifiers across the three tasks. In CS mode, to assess whether classifier choices significantly differed when Spanish nouns were paired with different Chinese classifiers in CS mode, a one-way repeated-measures ANOVA was conducted for production tasks. Given the nature of the comprehension data, i.e., the violation of normality and the presence of a within-subject factor with two levels, a non-parametric Wilcoxon signed-rank test was used. Results showed that classifier choices are significantly different when Spanish nouns pair with distinct Chinese classifiers in all three tasks: director-matcher task ($F(1.28, 37.14) = 13.18$, $p < .001$, $\eta^2\_G = .31$), repetition task ($F(1.22, 35.26) = 42.29$, $p < .001$, $\eta^2\_G = .57$), and judgment task ($V = 392$, $p < .001$, $r = .70$).

5.5.1 Production tasks

5.5.1.1 Director-Matcher task (Toy task)

Unilingual mode

In unilingual mode, 960 trials were initially collected, of which 959 contained identifiable classifiers within NPs for further analysis (i.e., one trial was removed due to error). Three distinct patterns were observed in unilingual Chinese NPs, with NPs presented in bold and italics for clarity in examples (9), (10), and (11).

9. 第一行 第一列 是一 ***辆*** ***自行车***. [expected-specific classifier]
First raw first column is ***one CL.liang4 bicycle***.
NUM $CL_{expected}$ N
"The first column of the first column is a bicycle."
(speaker 10M)

10. 第三排 第三列 是一 ***朵*** ***假发***. [unexpected-specific classifier]
Third raw third column is ***one CL.duo3 wig***.
NUM $CL_{unexpected}$ N
"The third column of the third row is a wig."
(speaker 30M)

11. 第六列 是 ***一 个*** ***硬币***. [general classifier]
Sixth column is ***one CL.ge4 coin***.
NUM $CL_{general}$ N
"The sixth column is a coin."
(speaker 3D)

Examples (9), (10), and (11) highlight three combinations of classifiers and Chinese nouns in NPs: NPs with expected-specific classifiers, NPs with unexpected-specific classifiers, and NPs with the general classifier *ge* (see an overview in Table 5.5.1).

Table 5.5.1. Distribution of classifiers in unilingual Chinese NPs in the toy task.

	Total
Unilingual NPs with expected classifiers	711 (74.14%)
Unilingual NPs with general classifier *ge*	144 (15.02%)
Unilingual NPs with unexpected classifiers	104 (10.84%)
Total	959

Table 5.5.1 illustrates a strong tendency to use expected-specific classifiers for Chinese nouns in unilingual Chinese NPs (74.14%), compared to the combinations of the general classifier *ge* (15.02%) and unexpected-specific classifiers (10.84%). Overall, participants overwhelmingly preferred expected-specific classifiers in unilingual NPs in the director-matcher task. Moreover, a highly consistent pattern of classifier assignment was observed across participants and Chinese nouns (see Appendix 5.A).

CS mode

In CS mode, 960 mixed NPs were obtained, of which 9 trials (0.94%) were removed from further analysis as unexpected responses (e.g., errors) occurred. In general, three patterns with different identifiable classifiers in mixed NPs were observed in examples (12), (13), and (14), and mixed NPs are presented in bold and italics:

12. 在第一行 的 第一列 是一 ***艘 巨大的 barco***. [expected-specific classifier]
In first row of first column is ***one CL-sou1 huge ship***.
NUM $CL_{expected}$ ADJ N
"In the first column of the first row is a huge ship."
(e.g., speaker 17D)

13. 第一行 第二列 我有 ***一 头 蓝色的 peluca***. [unexpected-specific classifier]
First row second column I have ***one CL-tou2 blue wig***.
NUM $CL_{unexpected}$ ADJ N
"I have a blue wig in the second column of the first row. "
(e.g., speaker 13D)

14. 第四个 图片 是 ***一 个 sombrero***. [general classifier]
The fourth picture is ***one CL-ge4 hat***.
NUM $CL_{general}$ N
"The fourth picture is a hat."
(e.g., speaker 22M)

Similar to the NPs in unilingual Chinese, participants produced three types of classifiers for Spanish nouns within mixed NPs: mixed NPs with expected-specific classifiers, mixed NPs with unexpected-specific classifiers, and NPs with the general classifier *ge* (see an overview in Table 5.5.2).

Table 5.5.2. Distribution of classifiers in mixed NPs in the toy task.

	Total
Mixed NPs with expected-specific classifiers	440 (46.27%)
Mixed NPs with the general classifier *ge*	367 (38.59%)
Mixed NPs with unexpected-specific classifiers	144 (15.14%)
Total	951

Table 5.5.2 illustrates that the occurrence of expected-specific classifiers (46.27%) and the general classifier *ge* (38.59%) with Spanish nouns in mixed NP is comparable ($p = 1$, $t = 0.93$), and that unexpected classifiers (15.14%) also sometimes occur with Spanish nouns. In sum, participants preferred both expected-specific classifiers and the general classifier *ge* for Spanish nouns within mixed NPs. Notably, the patterns of classifier assignment are also relatively consistent across participants and Spanish nouns in mixed NPs (see Appendix 5.B).

5.5.1.2 Repetition task

Unilingual mode

In unilingual mode, 1,920 trials were obtained, of which 221 (11.51%) were excluded due to unexpected responses (e.g., producing single nouns without classifiers) or no responses. Table 5.5.3 shows the distribution of general classifier *ge*, expected, and unexpected classifiers in participants' responses. Out of 1,217 responses with expected classifiers, 472 trials (38.8%) originally with the general classifier *ge* were changed to expected classifiers, while 745 trials (61.2%) remained with the original expected classifiers. For responses with general classifier *ge* (375 trials), 315 (84%) trials that originally had the general classifier *ge* were maintained in participants' responses, whereas 60 (16%) were changed from expected classifiers to general classifier *ge*. Additionally, there are responses with unexpected classifiers, which were changed from NPs with either the general classifier *ge* (66 trials, 71.7%) or expected classifiers (41 trials, 38.3%). Overall, participants showed preferences for using expected-specific classifiers in their repetitions. In addition, a similar trend of classifier assignment was observed across participants and items (see Appendix 5.C).

Table 5.5.3. Distribution of classifiers in unilingual NPs in the repetition task.

	General classifiers *ge*	Expected-specific classifiers	Total
NPs with general classifier *ge*	315 (84%)	60 (16%)	375
NPs with expected-specific classifiers	472 (38.8%)	745 (61.2%)	1,217
NPs with unexpected-specific classifiers	66 (61.7%)	41 (38.3%)	107
Total			1,699

Notes: 1. *NPs with general classifier (ge)*: NPs where the general classifier *ge* was used in participants' responses. The "**general classifier *ge***" column refers to NPs where the general classifier *ge* was maintained in participants' responses, while the "**expected-specific classifiers**" column indicates cases where participants changed expected-specific classifiers to general classifier *ge*. 2. *NPs with expected classifiers*: these are NPs that used a specific expected classifier. The "**general classifier *ge***" column reflects cases where participants replaced general classifier *ge* with expected-specific classifiers; the "**expected-specific classifiers**" column indicates cases where expected-classifiers remained unchanged. 3. *NPs with unexpected classifiers*: NPs that used specific **unexpected** classifiers. The "**general classifier *ge***" column refers to cases where participants changed the general classifier *ge* to unexpected-specific classifiers. The "**expected-specific classifiers**" column indicates cases where participants replaced expected-specific classifiers with unexpected-specific classifiers.

CS mode

In CS mode, 1,920 responses were collected, of which 312 (16.25%) were removed due to the same reason as in the unilingual mode. Table 5.5.4 illustrates that participants produced 815 mixed NPs with expected classifiers, of which 561 (68.8%) trials maintained the original use of expected classifiers, while 254 (31.2%) trials had the general classifier *ge* were replaced with expected classifiers. Regarding responses with the general classifier *ge* (663 trials), 473 (71.3%) mixed NPs retained the originally assigned general classifier *ge*, while 190 trials (28.7%) were changed from expected classifiers to the general classifier *ge*. Additionally, 130 responses involved the use of unexpected classifiers, with 76 (58.5%) changed from mixed NPs originally using the general classifier *ge,* and 54 trials (41.5%) modified from mixed NPs that initially contained expected classifiers. Overall, participants produced mixed NPs with expected classifiers at a rate comparable to those with the general classifier ge (p = 0.477, t = 1.45). Additionally, a relatively consistent pattern of classifier assignment was observed across participants and items (see Appendix 5.D).

Table 5.5.4. Distribution of classifiers in mixed NPs in the repetition task.

	General classifiers *ge*	Expected classifiers	Total
NPs with general classifier *ge*	473 (71.3%)	190 (28.7%)	663
NPs with expected classifiers	254 (31.2%)	561 (68.8%)	815
NPs with unexpected classifiers	76 (58.5%)	54 (41.5%)	130
Total			1,608

Note: The interpretation of Table 5.5.4 is the same as that in Table 5.5.3.

5.5.1.3 2AFC Judgment task

Unilingual mode

In the 2AFC judgment task, participants chose the more natural sentences from classifier-varied pairs within unilingual Chinese NPs, yielding 960 responses for the unilingual mode. Table 5.5.5 illustrates the distribution of preferences for classifiers within unilingual Chinese NPs. Table 5.5.5 shows an overwhelming preference for unilingual NPs with expected-specific classifiers (858 trials, 89.37%), compared to those with the general classifier *ge* (102 trials, 10.63%). In sum, participants exhibited a strong tendency to use expected-specific classifiers for unilingual NPs in the judgment task. Additionally, a prevalent trend of assigning classifiers across participants and items was observed (see Appendix 5.E).

Table 5.5.5. Distribution of classifiers in unilingual NPs in the 2AFC judgment task.

	Total
Unilingual NPs with general classifier *ge*	102 (10.63%)
Unilingunal NPs with expected classifiers	858 (89.37%)
Total	960

CS mode

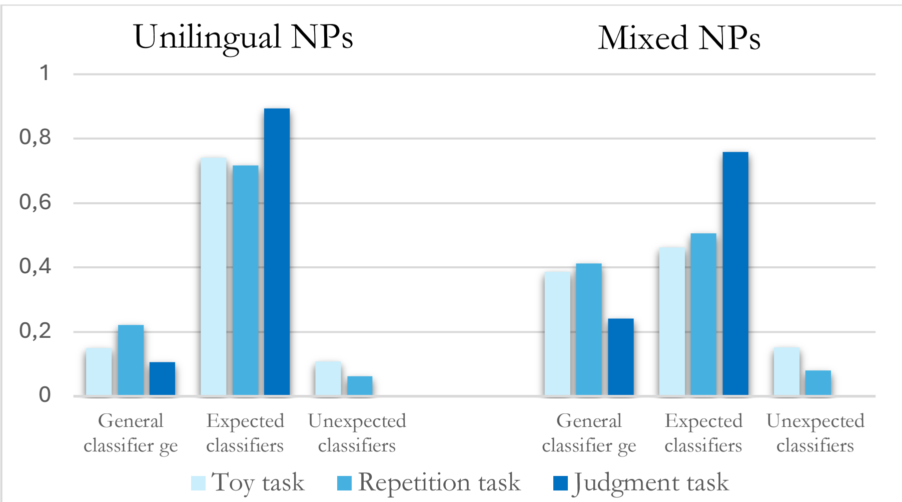
In the CS mode, 960 responses were collected, with the majority being mixed NPs using expected-specific classifiers (728 trials, 75.83%), while the remaining used the general classifier *ge* (232 trials, 24.17%, see an overview in Table 5.5.6). Overall, participants showed a strong preference for expected-specific classifiers over the general classifier *ge* in mixed NPs ($V = 392, p < .001, r = .70$), consistent with patterns observed in unilingual NPs. Additionally, a largely consistent pattern of classifier assignment was observed across participants and items, with only a few exceptions (see Appendix 5.F).

Table 5.5.6. Distribution of classifiers in mixed NPs in the 2AFC judgment task.

	Total
Mixed NPs with general classifier *ge*	232 (24.17%)
Mixed NPs with expected classifiers	728 (75.83%)
Total	960

Overall, participants showed a clear preference for expected-specific classifiers (i.e., 74.14% for the toy task, 71.63% for the repetition task, and 89.37% for the 2AFC task) with Chinese nouns in unilingual Chinese NPs across all three tasks, though the general classifier *ge* and unexpected classifiers were occasionally used. In contrast, for Spanish nouns in mixed NPs, participants showed comparable preferences for using the general classifier *ge* (i.e., 38.59% for the toy task, 41.23% for the repetition task) and expected-specific classifiers (46.27% for the toy task, 50.68% for the repetition task) in production tasks, but exhibited a strong tendency for expected-specific classifiers (75.85%) in the comprehension task (see Figure 5.5.1).

Figure 5.5.1. Distribution of classifiers in unilingual and mixed NPs across three tasks.



5.6 Discussion

This study investigated how early Spanish–Chinese bilinguals assign Chinese classifiers in mixed Chinese–Spanish NPs across production and comprehension, particularly examining whether they default to the general classifier *ge* when producing Spanish nouns and whether they use comparable patterns to assign classifiers in unilingual and CS mode. Building on this, we further examined which classifier assignment strategies bilinguals would employ when assigning classifiers to Spanish nouns in mixed NPs.

Variation in classifier assignment across language mode and tasks

The first key finding is that early Spanish–Chinese bilinguals exhibited a consistent preference for expected-specific classifiers in unilingual NPs across production and comprehension. In contrast, in mixed Chinese–Spanish NPs, their classifier choices showed task-dependent variations. In production, bilinguals used both the general classifier *ge* and expected-specific classifiers for Spanish nouns at relatively equal rates. Conversely, in comprehension, expected-specific classifiers were predominantly assigned to Spanish nouns. In sum, in response to the first two research questions, which refer to whether bilinguals default to the classifier *ge* for Spanish nouns in mixed NPs and whether the classifier patterns in mixed NPs resemble those in unilingual NPs, the findings suggest that bilinguals' classifier choices exhibited language mode-dependent and task-dependent variations. These findings support the first two hypotheses.

The varying patterns of classifier assignment across language contexts highlight differences in the underlying processing of classifiers in unilingual and CS modes. In the unilingual mode, bilinguals relied heavily on both the semantic properties of Chinese nouns and rote memory of their associated classifiers (Li & Thompson, 1981). When producing unilingual Chinese NPs, the selection of a semantically "proper" classifier is relatively straightforward, as the obvious semantic features of Chinese nouns (e.g., 树 /shu4/ "tree") readily activate the corresponding classifiers (棵 /ke1/, "specific classifier for plants"), facilitating the frequent use of expected classifiers. In CS mode, bilinguals drew on both the general classifier *ge* that defaults to Spanish nouns and expected-specific classifiers that are highly associated with Chinese equivalents of Spanish nouns during production, resulting in relatively equal use of the general classifier *ge* and expected classifiers in mixed NPs. When producing classifiers for Spanish nouns, which often lack the straightforward semantic cue typically available in Chinese, bilinguals may fail to recall the "proper" classifier or rote-remembered classifiers due to weaker or absent obvious semantic associations. In such cases, the general classifier *ge* becomes a convenient and accessible substitute. This interplay between defaulting and semantic mapping led to high frequencies of both classifiers in production. However, in comprehension, bilinguals' classifier choices were influenced strongly by the design of the task, which explicitly contrasted classifier-noun pairings, increasing their metalinguistic awareness and prompting them to evaluate classifiers based on their appropriateness for the Chinese equivalents (see details below). This, in turn, prompted the high occurrence of expected-specific classifiers for Spanish nouns in comprehension.

Classifier assignment strategies in production and comprehension

The second key finding, addressing the third research question concerning the classifier assignment strategies employed by bilinguals in mixed NPs, reveals distinct strategies across production and comprehension. In production, bilinguals adopted both default and translation equivalent strategies, as evidenced by the relatively equal frequency of Spanish nouns being paired with the general classifier *ge* and with expected-specific classifiers. This suggests both strategies are frequently utilized. However, in comprehension, bilinguals predominantly selected expected-specific classifiers highly associated with Chinese equivalents of Spanish nouns, reflecting a preference for the translation equivalent strategy. This exclusive preference is likely influenced by the task design, which presented mixed NPs in pairs of contrasting nouns with either the general classifier *ge* or expected-specific classifiers. Such a task design may increase participants' metalinguistic awareness of comparing two classifiers, amplifying their attention to the semantic fit between classifiers and Chinese equivalents of Spanish nouns. Consequently, the use of the translation equivalent strategy is likely promoted. Overall, early Spanish–Chinese bilinguals employed varied classifier assignment strategies in production and comprehension, which supports the third hypothesis.

Influence of community norms

Interestingly, the classifier assignment strategies in mixed Chinese–Spanish NPs parallel findings from the study on Spanish grammatical gender assignment in mixed Spanish–Chinese NPs using similar tasks (e.g., Wu et al., 2025). In both cases, early Spanish–Chinese bilinguals from the same community in Barcelona favored a combination of default and translation equivalent strategies in production, but preferred only translation equivalents in comprehension (see Wu et al., 2025). This cross-language consistency of strategies may suggest that the choice of assignment strategies in this community may be shaped not solely by shared underlying mechanisms for managing cross-linguistic structure, but also by broader sociolinguistic factors. A key factor appears to be the highly diverse linguistic interactions within their community, as documented in the study of grammatical gender assignment among Spanish–Chinese bilinguals within the same community (see Wu et al., 2025). Spanish–Chinese bilinguals in Barcelona grow up in a dynamic multilingual environment, engaging regularly with Chinese and Spanish monolinguals, Catalan–Spanish bilinguals, Chinese–Spanish–Catalan trilinguals, and individuals from other language backgrounds such as English. Wu et al. (2025) reported that such exposure to various language practices fosters a heightened level of adaptability and flexibility in bilinguals' adoption of gender assignment strategies. Rather than adhering to a uniform mapping system, bilinguals in this diverse linguistic context seem to adopt community-shaped strategies, such as defaulting or drawing on translation equivalents. Likewise, the current findings suggest that classifier assignment strategies among Spanish–Chinese bilinguals also reflect this adaptability and flexibility, suggesting that classifier selection, like gender assignment, is likely to be shaped by community diversity and sociolinguistic context. These findings add to existing research by demonstrating that these flexible approaches are not limited to gender assignment but also extend to classifier systems, pointing to a more general bilingual strategy for navigating multiple linguistic systems and norms.

Inter-speaker variation of classifier assignment

Notably, early Spanish–Chinese bilinguals exhibited inter-speaker variation in classifier assignment, especially in mixed Chinese–Spanish NPs (see Appendixes 5.A–F). For a given Spanish noun, individuals assigned different types of classifiers, i.e., expected-specific classifiers, the general classifier *ge*, or unexpected-specific classifiers. These variations likely reflect multiple interacting factors, including the semantic properties of nouns, speakers' memorized associations between specific classifiers and nouns based on prior exposure, and the relative frequency of classifier usage. Such variation is not unexpected, given the non-binary nature of the Chinese classifier system. Unlike binary grammatical systems (e.g., masculine and feminine in Spanish), the Chinese classifier system involves dozens of classifiers with overlapping functions and semantic usage rules, making it more prone to variability. Similar patterns of variability have been observed in non-binary gender systems, such as the five-gender Tsova-Tush system (Bellamy & Wichers Schreur, 2022), where Tsova-Tush–Georgian bilinguals also showed variable gender assignment patterns shaped by linguistic and extra-linguistic factors and usage frequency. Another likely source of variation in classifier use among participants is their language acquisition background. Most participants acquired Chinese in informal settings, primarily at home or heritage language schools (i.e., weekend or community Chinese language schools), where formal exposure is typically limited to a few hours per week. Consequently, many did not develop a classifier system as robust and stable as that of monolingual speakers raised in China (who typically receive explicit and systematic instruction in the language), leading to inconsistencies in classifier choice and a higher reliance on the general classifier *ge*. Nonetheless, more naturalistic data on Chinese–Spanish intra-clausal code-switching are needed to better understand how classifier variability unfolds in spontaneous bilingual speech. Such data would allow us to evaluate whether the patterns observed in experimental settings align with those found in everyday language use and shed light on how context and interaction shape bilingual choices.

This study offers the first exploration of classifier assignment in mixed noun phrases among early Spanish–Chinese bilinguals. The findings provide important initial insights into how bilinguals manage grammatical "conflict sites", such as the differing presence of classifiers in their two languages, and how they process classifiers within mixed NPs. However, these results should be regarded as preliminary. To enhance our understa-nding and assess the broader applicability of these patterns, future research should include a wider range of bilingual populations and employ varied task designs. Such work will be crucial for establishing the generalizability and underlying mechanisms of classifier assignment strategies in bilingual contexts.

5.7 Conclusion

This study examined how early Spanish–Chinese bilinguals assign classifiers to Spanish nouns and further identified the classifier assignment strategies they preferred in mixed Chinese–Spanish NPs. By employing a multi-task approach, we found that bilinguals preferred expected-specific classifiers in the unilingual mode, and they did not uniformly default to the general classifier *ge* when producing Spanish nouns in CS mode. Instead, they used both the general classifier *ge* and expected-specific classifiers in production, while they showed a strong preference for expected classifiers in comprehension. These patterns indicate that bilinguals draw on various strategies, the default and translation equivalent strategies, when navigating classifier assignment, with task type and language mode influencing their choices. As the first study to examine classifier assignment in mixed NPs among early Spanish–Chinese bilinguals using a multi-task design, this work sheds light on a previously underexplored aspect of cross-linguistic interaction and provides a comprehensive view of classifier assignment strategies. Notably, the findings reveal striking parallels between classifier assignment and grammatical gender assignment observed in the same community, underscoring the role of community characteristics, social network, and task type in shaping language use and highlighting the flexibility and adaptability of bilinguals. However, given that this is the first study on classifier assignment in mixed NPs, further studies with larger and more diverse participant samples and varied methodologies are needed to fully understand classifier use in bilingual speech and to determine the generalizability of these strategies across other bilingual populations.

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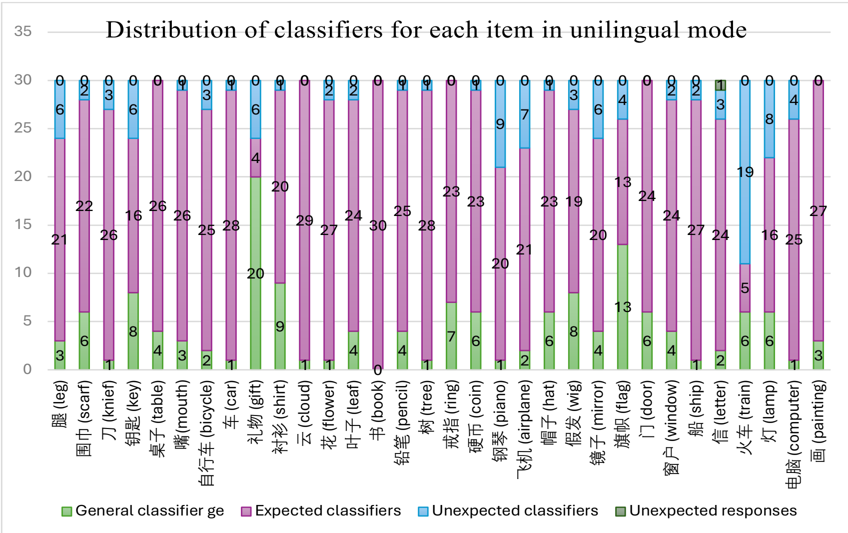
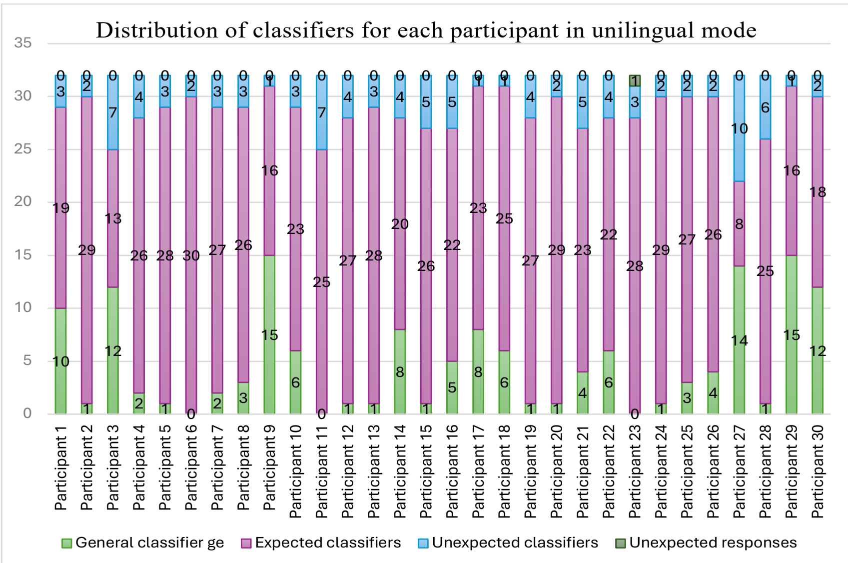
Data Availability Statement

All related materials, including experimental stimulus lists, BCSP questionnaire, statistical analyses, and results for three tasks are openly available in Open Science Framework at https://osf.io/ar3w4/?view_only=622bd917c8124c86ac2031cf4b8b5584 (view-only link).

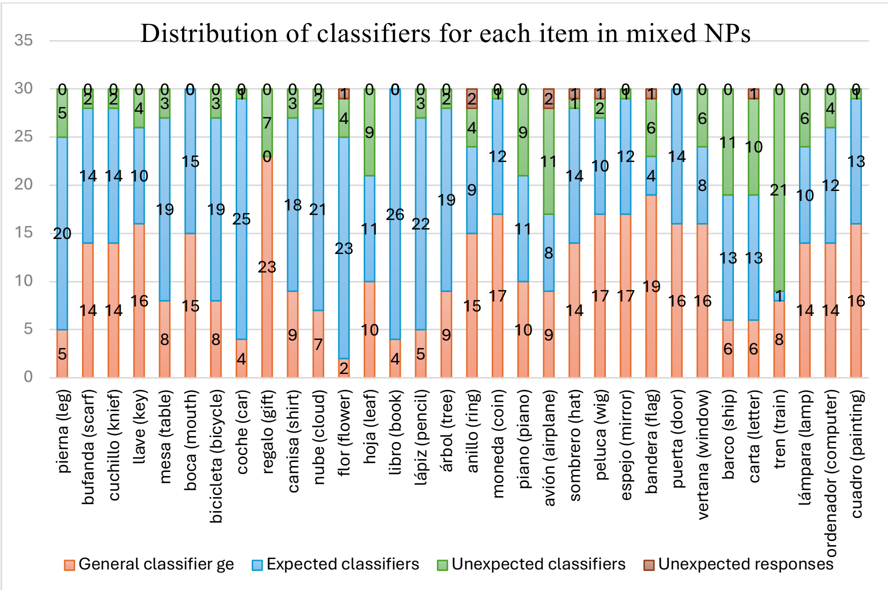
Appendix

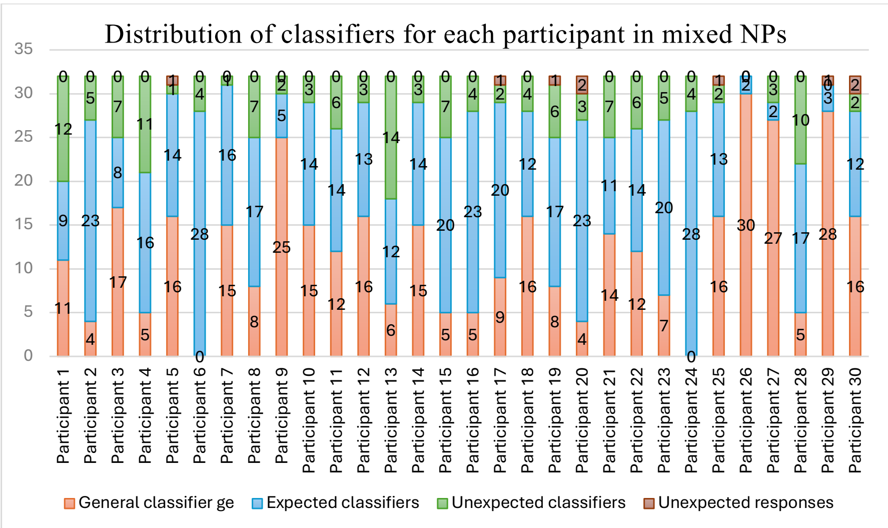
Appendix 5.A Distribution of classifiers across items and participants in unilingual NPs in the Director-Matcher task.



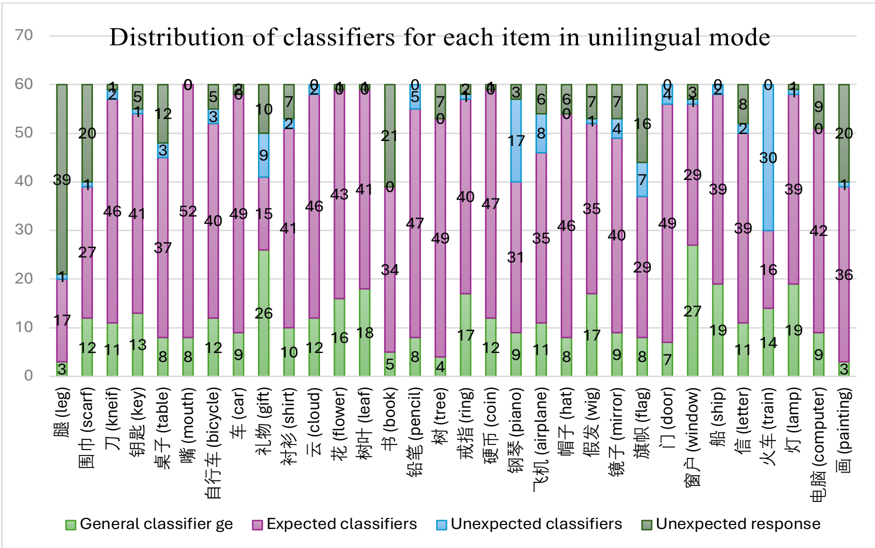


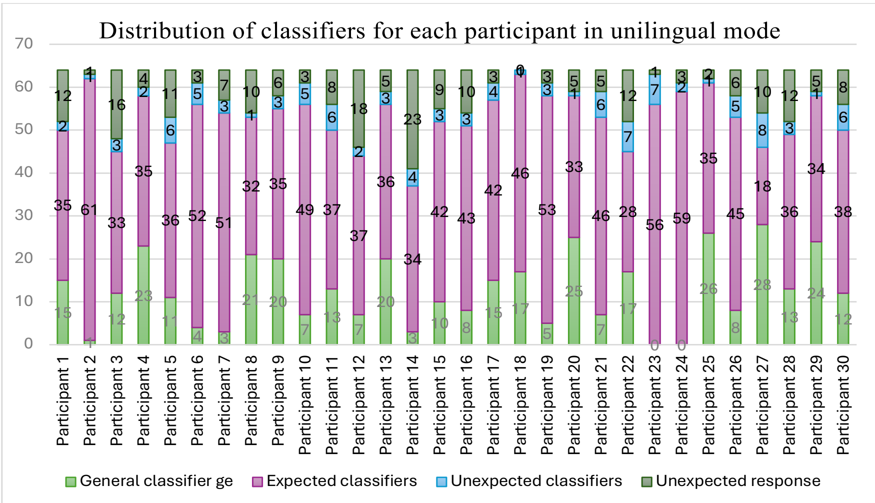
Appendix 5.B Distribution of classifiers across items and participants in mixed NPs in the Director-Matcher task.



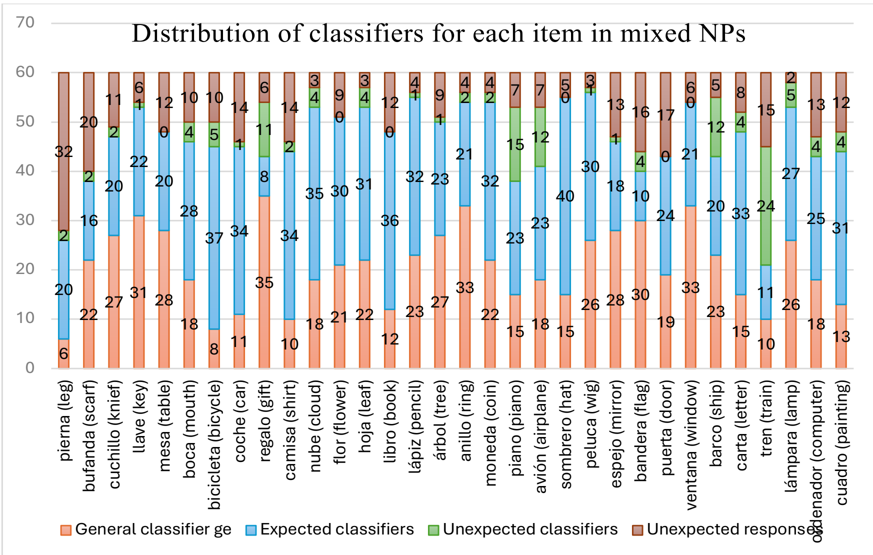


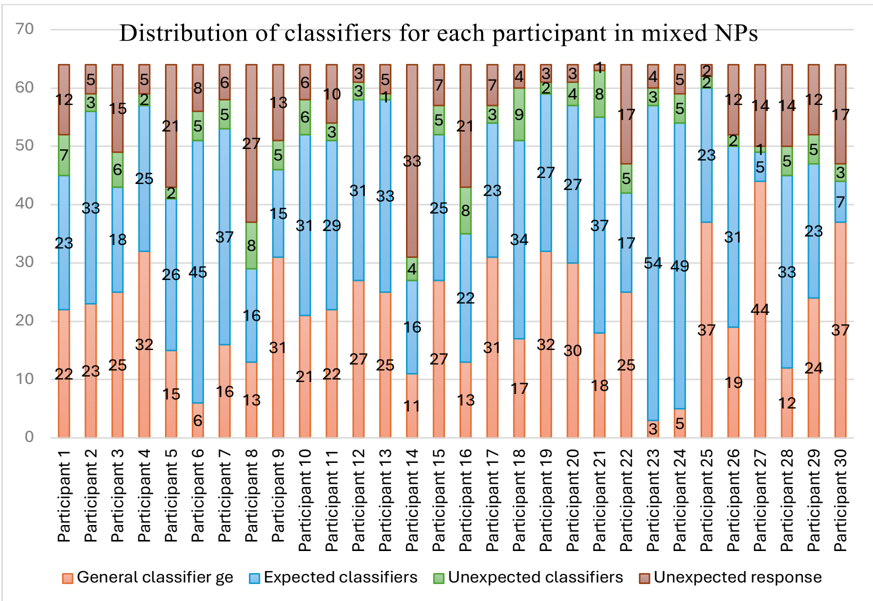
Appendix 5.C Distribution of classifiers across items and participants in unilingual NPs in the repetition task.



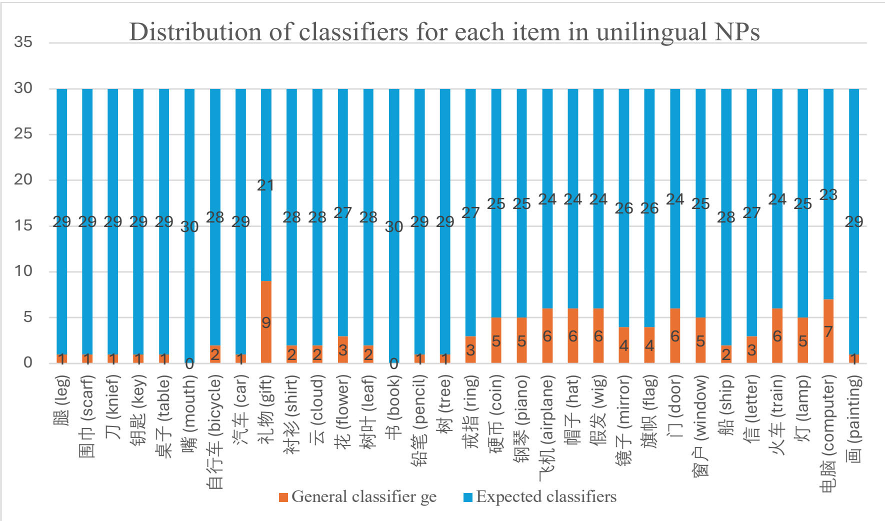


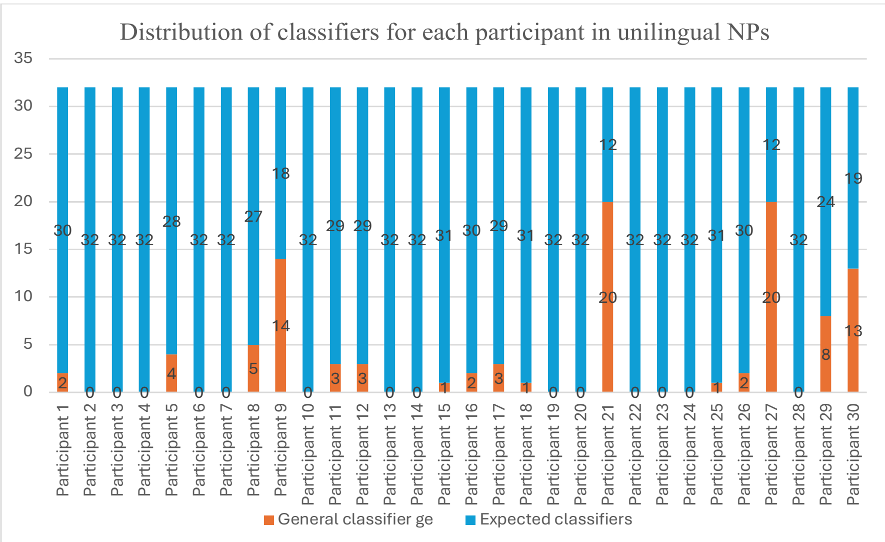
Appendix 5.D Distribution of classifiers across items and participants in mixed NPs in the repetition task.





Appendix 5.E Distribution of classifiers across items and participants in unilingual NPs in the 2AFC judgment task.





Appendix 5.F Distribution of classifiers across items and participants in mixed NPs in the 2AFC judgment task.