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 7

General Discussion

This thesis represents the first comprehensive, multi-method investigation into how Spanish–Chinese bilinguals manage lexico-syntactic features across both unilingual and bilingual contexts. By employing a combination of behavioral, neurocognitive, and multi-task paradigms, the research seeks to address the central question of how bilingual individuals process grammatical and structural differences between typologically distinct languages. Specifically, we thoroughly explored how the interplay of linguistic, cognitive, and social factors, as well as task type/demands and community characteristics, shapes bilinguals' processing of grammatical patterns in unilingual and bilingual contexts. By doing so, this thesis therefore advances our understanding on several aspects: first, underscoring how two different linguistic systems are processed, integrated, and interact in bilinguals' minds; second, providing in-depth understanding of the similarities and differences when processing diverse lexico-syntactic features across unilingual and bilingual contexts; third, highlighting bilinguals' shared underlying mechanisms for processing functionally comparable lexico-syntactic features across their languages; fourth, pointing out the importance of exploring bilingualism as discovery science.

More precisely, through a series of (semi-)experimental tasks, we examined how Spanish–Chinese bilingual speakers process and produce key lexico-syntactic features, including grammatical gender, classifiers, and adjective placement in both unilingual and bilingual contexts. This line of inquiry was motivated by the typological differences between Spanish and Chinese, which, despite their typological and grammatical divergence, share comparable lexico-syntactic features. Moreover, research remains limited on how bilinguals navigate such cross-linguistic differences and comparable lexico-syntactic features during language processing and production across different contexts. To address this gap, we investigated five critical issues in depth: first, we examined and identified the gender congruency effect in Spanish NPs among Spanish speakers within unilingual contexts; second, we explored early Spanish–Chinese bilinguals' underlying mechanism of gender assignment in mixed Spanish–Chinese NPs within bilingual contexts; third, we investigated the classifier congruency

effect in Chinese NP production within unilingual contexts among Mandarin Chinese speakers and early Spanish–Chinese bilinguals, using behavioral and electrophysiological measures to quantify the similarity and robustness of this effect across the two groups; fourth, we studied the underlying mechanism of classifier assignment among early Spanish–Chinese bilinguals in mixed Chinese–Spanish NPs within bilingual contexts; fifth, we examined how early Spanish–Chinese bilinguals resolve conflicts arising from adjective-noun word order differences across Spanish and Chinese in both unilingual and bilingual contexts.

In this chapter, we revisit the overarching research question that shaped the thesis and provide an integrated summary of the key findings from each chapter. We discuss how the results contribute to a deeper understanding of the processing involved in managing lexico-syntactic structures in both unilingual and bilingual contexts across Spanish and Chinese. Emphasis was placed on how bilinguals navigate grammatical gender, classifiers, and adjective-noun word order conflicts, shedding light on how the two language systems interact and interplay during bilingual language production and comprehension. We conclude this chapter with a discussion of the limitations of this thesis, including methodological constraints and the limited participant scope, and suggest directions for future studies to address these issues.

7.1 Discussion of chapter findings

In **Chapter 2** of this thesis, we explored whether grammatical gender, as a lexico-syntactic feature in Spanish, is used to competitively select determiners in NP production by Spanish speakers, and whether this competition is reflected in a *gender congruency effect*. This was motivated by the conflicting findings in previous studies on Romance languages regarding the presence of the gender congruency effect (see Wang & Schiller, 2019; Sá Leite et al., 2022; and Bürki et al., 2023 for an overview). In this chapter, we therefore employed a PWI-based picture naming task to probe the presence of the gender congruency effect. According to the

lexical selection by competition theory (Levelt et al., 1999; Roelofs, 2003), speakers take longer to select and produce a target word when more highly non-target words are activated and compete for selection. Based on this, our working hypothesis was that Spanish speakers would name target pictures faster when distractor words matched the target in grammatical gender (gender-congruent condition), compared to when they did not (gender-incongruent condition). In line with our hypothesis, we predicted shorter naming latencies in gender-congruent conditions than in gender-incongruent conditions. Our results indicated a significant gender congruency effect in Spanish NP production, with participants naming targets significantly faster when paired with gender-congruent distractors than with gender-incongruent ones. As such, we provide clear evidence for the presence of the gender congruency effect in Spanish NP production.

Our behavioral results are important for several reasons: first, the significantly faster naming latencies in gender-congruent conditions suggest the presence of a *gender congruency effect* during gender processing; second, the gender congruency effect implies that competition occurred during the process of gender feature selection, in which different gender values for the target picture and the distractor were activated in the gender-incongruent condition, and gender features of distractors competed for selection at the lemma level; third, the statistically significant longer naming latencies in gender-incongruent conditions also suggests that the competition can be reflected by a naming latencies effect in Spanish NP production. Taken together, this study provides crucial behavioral evidence for the presence of the gender congruency effect in Spanish NP production, contributing to addressing the controversial findings in Romance languages. Moreover, it provides insights into how grammatical gender is processed and produced in unilingual Spanish contexts, laying the foundation for a broad exploration of lexico-syntactic features across languages and contexts.

In **Chapter 3** of this thesis, we shifted the focus to grammatical gender assignment in mixed Spanish–Chinese NPs by early Spanish–

Chinese bilinguals. Having established how grammatical gender is processed and produced in unilingual Spanish NPs in Chapter 2, we were interested in examining how it is processed and assigned in Spanish–Chinese bilingual NPs. Here, we asked the fundamental question of which gender assignment strategy, i.e., a masculine default strategy (e.g., *el* 桌子 "the$_{MASC}$ table$_{FEM}$") or a translation equivalent strategy (e.g., *la* 桌子 "the$_{FEM}$ table$_{FEM}$", where the Spanish equivalent of "table", *mesa*, is feminine), early Spanish–Chinese bilinguals use when assigning Spanish grammatical gender (masculine or feminine) to Chinese nouns in mixed Spanish–Chinese NPs. Previous studies have suggested that gender assignment strategies vary depending on linguistic, cognitive, and sociolinguistic factors, as well as task type and demands (cf. Bellamy & Parafita Couto, 2022). Accordingly, we predicted that early Spanish–Chinese bilinguals would employ different strategies across tasks, reflecting the combined influence of task type as well as linguistic, cognitive, and sociolinguistic factors. Using a multi-task approach, we found task-dependent variation in gender assignment, with bilinguals employing both masculine default and translation equivalent strategies in production, while showing a clear tendency toward the translation equivalent strategy in comprehension. Moreover, we highlighted that the diverse social network in the community, task demands, metalinguistic awareness, and linguistic variability play crucial roles in shaping bilingual language use.

Our study underscores the importance of documenting variation in bilingual communities for several reasons: first, our study is the first to explore gender assignment strategies in mixed Spanish–Chinese NPs using multiple tasks, offering fresh insights into gender assignments in bilingual speech; second, through explaining gender assignment patterns by early Spanish–Chinese bilinguals, we contribute to an understanding of the cognitive processes underlying gender assignment in bilingual contexts; third, our study provides evidence that variation in gender assignment is shaped not only by linguistic properties but also by task type and community characteristics, emphasizing the need for further research on how these factors interact in bilingual populations; fourth, our findings suggest that

the variability in gender assignment strategies not only defines uniformity but also creates a shared norm within the bilingual community. This emphasizes the collective adaptability in language use and highlights bilingualism as an adaptive response to social and cognitive demands. Together, our study provides a crucial piece of evidence for understanding how grammatical gender, as one of the lexico-syntactic features, is navigated in bilingual contexts.

Chapter 4 extends the investigation of lexico-syntactic features by turning to a typologically different language, Mandarin Chinese, which features a classifier system that is comparable to grammatical gender. More precisely, we were interested in examining the processing and production of unilingual Chinese classifier-NPs by early Spanish–Chinese bilingual speakers. In previous literature, it is well-established that classifiers, similar to grammatical gender, undergo a comparable competitive selection process in Chinese NP production by monolingual speakers (e.g., Wang et al., 2019; also see Wang & Schiller, in press and Qian, in press for an overview). This process is evidenced by the *classifier congruency effect*, analogous to the *gender congruency effect* observed in Spanish in Chapter 2 (see an overview of gender congruency effects in Wang & Schiller, 2019 and Sá Leite et al., 2022; classifier congruency effects in Wang et al., 2019 and Huang & Schiller, 2021). However, the critical question we investigated in this chapter is whether bilingual speakers undergo a similar competitive selection process when producing Chinese classifier-NPs, particularly whether this is reflected in behavioral and electrophysiological evidence. Yet, to our knowledge, limited research has investigated how this process unfolds in bilingual speakers, especially using neurocognitive methods. Therefore, our primary research question was whether early Spanish–Chinese bilinguals show a classifier congruency effect in Chinese NP production. To ensure the robustness of our investigation, we included Mandarin Chinese speakers as a comparison group. Using a PWI-based picture-naming task, we examined naming latencies to assess whether the selection of classifiers is behaviorally competitive, and we analyzed electrophysiological responses to determine whether classifier

violations elicit electrophysiological correlates such as an N400-like effect. By doing so, we probed the presence of the classifier congruency effect in Chinese NP production by Spanish–Chinese bilingual speakers, both behaviorally and electrophysiologically.

Our behavioral results revealed a robust classifier congruency effect in both groups, which entailed significantly shorter naming latencies when the target picture and distractor word matched in classifiers (classifier-congruent conditions) compared to when they mismatched (classifier-incongruent conditions). This suggested that a competitive selection process was involved in classifier retrieval during NP production in classifier-incongruent conditions. At the neurocognitive level, we found an ERP correlate that was consistent with the N400 component in both groups, which was elicited by classifier-incongruent conditions. Critically, we observed a more negative-going N400-like wave in classifier-incongruent compared to classifier-congruent conditions in both groups. Taken together, our study provides crucial behavioral and electrophysiological evidence for the presence of a classifier congruency effect in Chinese NP production among bilinguals. Moreover, it offers insights into the similarities in the underlying mechanisms involved in classifier processing and selection across both groups in unilingual Chinese NP production. As such, obtaining a clearer picture of how classifiers are processed in unilingual Chinese NPs by bilinguals could be a critical milestone in understanding how they manage lexico-syntactic features in unilingual contexts.

Chapter 5 continues the investigation of classifier selection in Mandarin Chinese by early Spanish–Chinese bilingual speakers and extends it to Chinese–Spanish NP in bilingual contexts. This chapter was built directly on Chapter 3, with a shifted focus on the classifier assignment in mixed Chinese–Spanish NPs. Thus, we asked an identical question as in Chapter 3 to examine which classifier assignment strategies early Spanish–Chinese bilinguals employ when assigning classifiers to Spanish nouns in mixed NPs, such as a translation equivalent strategy (e.g., *一棵árbol*, [one + specific-classifier-ke1 + tree], "one tree", where the expected-specific

classifier for the Chinese equivalent of "tree", *树* /shu4/, is *棵* /ke1/, "a specific classifier used for plants") or a default strategy (e.g., *一个árbol*, [one + general-classifier-ge4 + tree], "one tree", where the general classifier *个* /ge4/ is used as default in Chinese). Employing a multi-task approach parallel to Chapter 3, we observed a remarkably similar task-dependent variation in classifier assignment among Spanish–Chinese bilinguals, mirroring the grammatical gender assignment patterns reported in Chapter 3. This was evidenced by their use of both default and translation equivalent strategies in production, while they favored the translation equivalent strategy in comprehension.

Crucially, this study revealed that the mixed strategies bilinguals use for classifier assignment closely mirror the patterns observed in grammatical gender assignment in mixed Spanish–Chinese NPs within the same bilingual community (see Chapter 3). These parallels highlight the roles of diverse social networks in the community, task demands, metalinguistic awareness, and linguistic variability in influencing bilingual language use. Moreover, our study suggests that exposure to diverse language practices promotes a high degree of adaptability and flexibility in how bilinguals process grammatical features. Together, this study provides key evidence that bilinguals rely on comparable underlying mechanisms for processing and assigning grammatical gender and classifiers in mixed NPs, thereby advancing our understanding of how Spanish–Chinese bilinguals manage comparable lexico-syntactic features across languages in bilingual contexts.

In **Chapter 6** of this thesis, we shift focus from language-specific lexico-syntactic features (grammatical gender and classifiers) to a shared feature, adjective placement, which exists in both Spanish and Chinese but is realized differently. Specifically, we evaluated how syntactic constraints, proposed by two models (the MLF and MP), shape bilinguals' code-switched adjective-noun patterns and code-switching behaviors. Alongside this aim, we also examined whether noun insertion, which was documented as the preferred pattern in previous studies (e.g., Parafita Couto et al., 2015; Vanden Wyngaerd, 2017; Van Osch et al., 2023), is preferred by

Spanish–Chinese bilinguals. Previous studies yielded inconclusive results regarding which model could fully explain grammatical patterns in adjective placement in code-switched speech (see Section 1.2.3 and Chapter 6 for detailed descriptions). Building on this, we extended the investigation of adjective placement to an understudied language pair and bilingual population in both unilingual and bilingual contexts. In doing so, we examined the code-switching patterns that early Spanish–Chinese bilinguals favor in production and comprehension. Moreover, we also investigated how the MLF and MP frameworks inform adjective placement in mixed adjective-noun constructions, thereby refining our understanding of code-switching patterns. Employing a multi-task approach, we observed that adjective-noun patterns vary across matrix languages and language contexts. Specifically, our results revealed a consistent preference for the expected default word orders in unilingual contexts (prenominal in Chinese, postnominal in Spanish). In bilingual contexts, Spanish matrix language data supported MLF predictions in production, but MP better explained both production and comprehension patterns. In contrast, Chinese matrix language data supported both models. Additionally, noun insertions were preferred over adjective insertions, aligning with trends in other bilingual communities.

This study, to our knowledge, is the first to empirically examine adjective placement conflicts in Spanish–Chinese code-switching, providing new insight into how the interplay of task type, language mode, and grammatical constraints proposed by the two models shapes mixed adjective-noun constructions in bilingual production and comprehension. Our findings provide evidence that, although the two models make competing predictions regarding adjective placement, both matrix language structure (MLF) and morphosyntactic properties of individual lexical items (MP) contribute to constructing mixed adjective-noun constructions among Spanish–Chinese bilinguals. These results challenge the singular predictions proposed by each model individually and suggest that no single grammatical constraint from either model can fully explain the observed code-switching patterns. Instead, a more comprehensive understanding of

mixed adjective-noun constructions requires acknowledging the combined influence of both clausal structures and morphosyntactic properties of individual lexical items. Together, our study contributes valuable data from an understudied language combination and bilingual community, offering new insight into how grammatical constraints shape bilingual code-switching patterns and complements existing research on adjective placement in bilingual speech. Moreover, this study fills a crucial gap in our understanding of how typologically distinct languages interact at the shared lexico-syntactic level, where shared grammatical features exist in both languages but are realized differently, highlighting the complex interplay between structural constraints and bilingual processing mechanisms.

7.2 The broader picture

Taking all chapters together, this thesis lays the groundwork for a new line of inquiry into bilingual lexico-syntactic processing by presenting the first comprehensive, multi-method investigation of grammatical gender, classifiers, and the linear order of the adjectives and nouns in Spanish–Chinese bilinguals. To achieve this, we first examined Spanish speakers and Mandarin Chinese speakers, not only to establish baseline patterns, but also to gain a more nuanced understanding of how lexico-syntactic features are navigated in unilingual contexts. This foundation enables a more robust examination of how Spanish–Chinese bilinguals navigate these lexico-syntactic features in bilingual contexts. We also employed a multi-task approach, including an elicitation task, a repetition task, and a forced-choice acceptability judgment task, combined with behavioral and neural measures, such as a picture-naming task and electrophysiological measures, to examine several critical issues of bilingual lexico-syntactic processing across languages and contexts.

To address the first critical issue outlined in the Introduction and Chapter 2, we employed a behavioral picture-naming task to investigate whether grammatical gender is competitively selected during NP produ-

ction in unilingual Spanish. By doing this, we learnt that gender agreement between Spanish nouns and other elements (e.g., determiners and adjectives) is manifested by the reflection of the gender congruency effect in NP production. In other words, gender congruency between nouns and determiners (i.e., whether or not the nouns and determiners agree in gender) serves as a key factor in eliciting the gender congruency effect in Spanish speakers' production. This finding has directly demonstrated how grammatical gender is processed in unilingual contexts, establishing the foundation for the subsequent investigation of grammatical gender, particularly for exploring how grammatical gender is processed and assigned in mixed NPs within bilingual contexts.

After establishing the processing of grammatical gender in unilingual Spanish NPs, we then turn to the second critical issue, which concerns the assignment of grammatical gender in mixed NPs within bilingual contexts. To tackle this issue, we employed a multi-task approach to investigate how early Spanish–Chinese bilinguals assign gender to Chinese nouns in mixed NPs during production and comprehension, and to identify the gender assignment strategies they employ. We observed task-dependent variability in gender assignment and identified varied gender assignment strategies across tasks. These findings imply that the interplay of social network, task type, and cognitive demands plays a crucial role in shaping bilinguals' gender assignment patterns, highlighting the flexible and adaptable nature of bilingual language processing. Combined with the investigation of grammatical gender processing in unilingual contexts, these two studies provide comprehensive insights into how grammatical gender is processed and produced in both unilingual and bilingual contexts.

Regarding the third issue, whether classifiers, as another lexico-syntactic feature, are activated and competitively selected during unilingual Chinese NP production, we found that both Mandarin Chinese speakers and Spanish–Chinese bilinguals were indeed sensitive to classifier violations at the behavioral and neurocognitive level. This sensitivity is reflected in the presence of a classifier congruency effect, observed not only in the naming speed of producing classifier-NPs during picture-

naming tasks, but also in the neurocognitive correlates of classifier processing, specifically an N400-like effect elicited by classifier violations. This is a robust finding across different populations of speakers in unilingual contexts, which directly implies the characterization of classifier processing from the behavioral and neurocognitive perspectives. Critically, this study demonstrated striking parallels between grammatical gender (Spanish, see Chapter 2) and classifiers (Chinese) in terms of congruency effects, underscoring that, despite typological distinctions, bilinguals appear to employ shared underlying mechanisms for processing functionally comparable lexico-syntactic features across languages. Moreover, this study starts a broader line of inquiry into the investigation of lexico-syntactic features. It establishes a robust empirical foundation for investigating classifier processing and assignment in mixed NPs within bilingual contexts.

With respect to the fourth critical issue, which parallels the investigation of grammatical gender assignment in Chapter 3, we examined classifier assignment strategies in mixed NPs preferred by Spanish–Chinese bilinguals from the same community. We observed comparable task-dependent variability in classifier assignment strategies, closely resembling those used for grammatical gender. This suggests bilinguals may apply similar underlying mechanisms when navigating structurally different but functionally comparable lexico-syntactic features. This finding is significant because it demonstrates that bilinguals do not rigidly adhere to one assignment strategy, but instead flexibly adapt their language processing and production based on task demands, sociolinguistic context, and the specific lexico-syntactic features involved. In particular, we found that the consistent influence of social network, task type, and cognitive demands across both grammatical gender and classifier assignment may enable bilinguals to flexibly adapt their linguistic choices in bilingual language use. Critically, this finding has direct implications for understanding the underlying mechanisms involved in processing lexico-syntactic features in bilingual contexts. It sheds light on how the flexibility of bilingual grammatical systems interacts with cognitive demand and sociolinguistic influences to shape bilingual language behavior.

In terms of the fifth critical issue, we shift our attention to the syntactic conflict of linear order between adjectives and nouns across Spanish and Chinese, which exists in both languages but is realized differently. To tackle this issue, we employed a multi-task approach to examine how bilinguals structure adjective-noun constructions based on grammatical constraints proposed by two theoretical models, the MLF and MP, within both unilingual and bilingual contexts. Research on this topic involving Spanish–Chinese languages remains particularly limited, making this study both critical and valuable. Critically, our finding challenges the idea that a single theoretical model (MLF or MP) fully explains code-switching patterns. Instead, our results strongly suggest that, although the two models make competing predictions regarding adjective placement, both matrix language structure (MLF) and the morphosyntactic properties of individual lexical items (MP) interact and contribute to mixed constructions, leading to a more fine-grained understanding of syntactic integration. This finding moves the field beyond a binary "either/or" debate between the two models. Moreover, this critical investigation offers new insights into bilingual language processing. It complements the study of grammatical gender and classifiers by revealing how bilinguals negotiate and integrate overlapping lexico-syntactic systems. As such, we demonstrate that the linear order of adjectives and nouns is an ideal lens that provides nuanced insights into bilingual language processing. It completes a crucial piece in understanding how such features are processed and integrated across languages and contexts.

By pooling several strands of empirical evidence in this thesis, we contribute novel insights into processing and integrating lexico-syntactic features across typologically distinct languages, Spanish and Chinese, within both unilingual and bilingual contexts. This work offers comprehensive accounts of how early Spanish–Chinese bilinguals navigate grammatical gender, classifiers, and adjective-noun word order across languages, thereby enriching the literature with data from an underexplored bilingual population. Moreover, the findings provide important building blocks to characterize how these cross-linguistic lexico-syntactic

features integrate and interact in bilinguals' minds, advancing our understanding of bilingual grammatical representation and processing.

7.3 Open science and bilingualism as discovery science

To continue the efforts on *open science* and *bilingualism as discovery science* in previous studies, which makes published findings of scientific research on bilingualism more robust, reproducible, and replicable, we also put special emphasis on making all our studies, related materials, and data analysis scripts in this thesis fully transparent, openly available, and easily accessible through the Open Science Framework (OSF, Foster & Deardorff, 2017). Moreover, we provide detailed descriptions of participants' full social background and language profile, task designs, stimulus selection criteria, the rationale for statistical analytical choices, and data analysis procedures across all chapters of this thesis. This level of transparency enhances the accessibility and replicability of our studies, contributing meaningfully to ongoing Open Science efforts. Beyond this, we continued the view of bilingualism as an ongoing discovery process in this thesis. Bilingualism is a complex and evolving phenomenon that is still far from fully defined or understood (Navarro-Torres et al., 2021), and it should be studied as a science of discovery. With this in mind, we designed our research by identifying convergent patterns across diverse studies and applying *variety* throughout all chapters in this thesis. To achieve this, we employed diverse research ideas and multi-method approaches, combined with detailed participant characterizations and accessible, transparent materials, rather than relying on simplified or uniform methodologies used in prior research. This approach not only prompts a more incremental and nuanced understanding of bilingualism but also ensures greater reliability and replicability of research findings. To sum up, *open science* and *bilingualism as discovery science* should be regarded as critical factors for ensuring the reliability, replicability, and robustness of future research on bilingualism.

7.4 Limitations and future research

While this thesis provides fresh insights into the process and production of lexico-syntactic features and adjective-noun word order patterns among Spanish–Chinese bilinguals, several limitations should be acknowledged. First and foremost, this thesis focuses on a specific bilingual population, early Spanish–Chinese bilinguals in Barcelona, Spain. While this population offers a valuable case to investigate bilingual language processing across two typologically distinct languages, the findings should be interpreted with caution in terms of their broader applicability. Bilingual communities vary widely in terms of sociolinguistic contexts, and factors such as language dominance, frequency and patterns of code-switching, community language practices, and the quantity and quality of input in each language can differ substantially depending on geographic location and social environment. These variables may significantly influence how bilinguals process and produce lexico-syntactic features. Therefore, future research is needed to determine whether the patterns observed in this study are consistent across other Spanish–Chinese bilingual populations, particularly those residing in different regions, immersed in different community norms, or shaped by distinct language acquisition trajectories. To do so, future research should conduct systematic replication studies across diverse Spanish–Chinese communities, such as in different regions or with varied acquisition trajectories, to test the generalizability of the findings.

Second, the investigation of grammatical gender congruency effects in unilingual Spanish NPs was limited to only Spanish speakers born and raised in Spanish-speaking countries without Chinese proficiency. This methodological choice was determined by the constraints imposed by the COVID-19 pandemic, which prevented the recruitment and testing of bilingual participants. As a result, the study does not offer insight into how early Spanish–Chinese bilinguals process grammatical gender in unilingual Spanish contexts, which is an important dimension that could further illustrate whether bilinguals exhibit similar processing mechanisms relative

to Spanish speakers. Moreover, this study only included behavioral measures, without incorporating neurocognitive measures such as EEG. The exclusion of EEG measures was primarily due to time constraints and limited prior experience with electrophysiological data collection and analysis. These limitations restricted our ability to explore the temporal dynamics and underlying neurocognitive correlates of gender processing in greater depth during language production. To address this limitation, future research should include early Spanish–Chinese bilinguals in these unilingual Spanish tasks with both behavioral and neurocognitive measures to fully understand their processing mechanisms compared to monolinguals.

Third, studies presented in this thesis primarily employ (semi-)experimental tasks, which, while offering high levels of control and replicability, may not fully reflect the complexity and variability of naturalistic language use. This is particularly relevant for understanding how bilingual speakers engage in code-switching and resolve morphosyntactic conflicts, such as grammatical gender assignment, classifier selection, or the linear word order of adjectives and nouns in spontaneous communicative contexts. The reliance on elicited production and judgment comprehension tasks means that the findings may not generalize to bilinguals' everyday language practices. The absence of conversational or spontaneous speech data limits our ability to evaluate how these lexico-syntactic features and syntactic differences are processed and negotiated in spontaneous and natural interactions. Thus, integrating longitudinal and corpus-based methods, alongside experimental designs, is essential to capture the full spectrum of spontaneous language use and evaluate the ecological validity of the findings.

Fourth, the interpretation of bilinguals' code-switching behaviors in this thesis may have been influenced by inconsistencies in participants' self-reported language use. Variability in individual understandings of what constitutes code-switching likely introduced inconsistencies. Such discrepancies can complicate the accurate measurement of switching frequency, patterns, and contextual usage. To enhance the validity and

consistency of future analyses, researchers should develop and use more objective and systematic observational methods for assessing code-switching behavior in natural settings, such as structured video recordings of spontaneous interactions or corpus-based annotations, ideally in combination with social network analysis to capture the influence of interpersonal and community-level factors.

Taken together, this thesis offers the first exploration of how lexico-syntactic features are processed and produced by early Spanish–Chinese bilinguals. The findings provide valuable insights into how bilinguals navigate these "conflict sites", such as the presence or absence of grammatical gender and classifier system, and the differences in adjective placement across their two languages, and how these features are processed and produced in different language contexts. While this thesis acknowledges several limitations, it nonetheless lays an important foundation for future research in this field. To build on these findings, future research should address these limitations by recruiting more diverse participant samples, integrating naturalistic data and neuroimaging methods, and employing more systematic and observational methods for assessing bilingual language behaviors to enhance validity and theoretical depth of subsequent research.