

A Systematic Review of Language Development in Simultaneous Bilinguals and Sequential Bilinguals: An Exploration from Cognitive Approach

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ABSTRACT: This systematic review investigates the lexical and grammatical development of simultaneous and sequential bilinguals. Grounded in a cognitive approach, the review analyzes how age of second language onset, input quantity, and contextual variables influence bilingual language acquisition. Findings indicate that monolinguals generally outperform both bilingual groups in vocabulary and grammar tasks, although simultaneous bilinguals tend to perform comparably to monolinguals in receptive vocabulary. Results on lexical and grammatical performance among bilingual groups are inconsistent, potentially due to factors such as age, input quality, and task design. Notably, lexical-grammatical associations are found to be stronger within a single language than across languages, and more robust in the second language than the first among sequential bilinguals. The review highlights the need for longitudinal designs and larger sample sizes in future research to enhance generalizability and understand developmental trajectories more comprehensively.

KEYWORDS: simultaneous bilinguals, sequential bilinguals, vocabulary development, grammar acquisition, lexical-grammatical association, cognitive linguistics

I. INTRODUCTION

Bilinguals have been increasingly becoming prevalent since more people get exposed to a second language as a result of education internationalization and immigration. The language development of bilinguals has remained a scientific matter that needs digging deep into, attracting great attention from not only parents but also educators and researchers all over the globe. There has been a surge in investigations into the field of bilingualism over the past decades. However, synthesizing the literature on this topic seems to be relatively complicated, considering various social backgrounds of the samples (Surrain & Luk, 2017) and related variables both internal and external, such as age of onset, length of exposure, amount of language input, and use of second language at home, etc. (Chondrogianni & Marinis, 2011). In fact, few scholars have systematically reviewed research on the matter of bilingualism. Surrain and Luk (2017) conducted a systematic review of labels and descriptions of bilinguals used in the literature between 2005 and 2015. With a large volume of analyzed research, Surrain and Luk's study broadly presents how bilingualism has been operationalized and bilingual experiences.

The present paper aims to systematically review a more focused aspect of bilingualism, the language development of people who acquire more than one language simultaneously or sequentially in terms of lexical knowledge and grammatical skills. The study firstly investigates how simultaneous bilinguals, and sequential bilinguals perform with respect to vocabulary and grammar usage. Also, the current systematic review analyses if there are any associations between lexical knowledge and grammatical skills in bilingual children or not.

II. LITERATURE REVIEW

Everyone is born with the ability to acquire language, as stated by Chomsky (1965). Language development is an inherent and fundamental process in human lives. Rudd and Kelley (2011) illustrated that language development is a high cognitive level incorporating auditory and oral skills in humans to communicate effectively. Since language develops as a natural process, people would master at least one, and for some individuals, more than one language, which is normally referred to as bilingualism. Bilingualism is a complex psychological and socio-cultural linguistic behaviours (Bhatia & Ritchie, 2004). Bloomfield (1933, p. 56) defined bilinguals as people having "native-like control of two languages". This conception narrows the population of bilinguals, and it is somehow hard to determine the standard of "native-like". The definition of Haugen (1953, p.7) broadens bilinguals to the fluent users of one language and "can produce complete meaningful utterances in the other language". More recently, Bhatia and Ritchie (2004) demonstrated that bilinguals are individuals who can use more than one language to communicate with people of certain communities, both in oral and written forms, with various proficient levels.

A Systematic Review of Language Development in Simultaneous Bilinguals and Sequential Bilinguals: An Exploration from Cognitive Approach

People may learn a second language under different circumstances, the time when kids start to learn an additional language accordingly varies dramatically from one person to another. Scholars have classified bilinguals into two categories based on the age that people get exposed to the second language for the first time, namely simultaneous and sequential bilinguals. Simultaneous bilinguals are children with early exposure to two languages from birth or very shortly thereafter, before the age of three (Katsos & Alexopoulou, 2011; Hoff, 2017). Sequential bilinguals, so-called successive bilinguals, are defined as those who learn a second language from three years old onwards (Katsos & Alexopoulou, 2011). Hoff (2017) clarified that people who first get access to an additional language in the first three years of life but attach to and spend most of the time developing their other tongue are regarded as sequential bilinguals. The age boundary differentiating between simultaneous and sequential bilinguals is ambiguous. Many academics have considered three years old as the frontier between these two bilingual groups according to the theory of critical period for language acquisition. Therefore, the present study adopts the age of three as the criterion to categorize bilinguals.

That simultaneous bilinguals learn two languages at the same time from infancy could be qualified as the acquisition of two first languages. For this reason, it is believed that these two languages are processed in similar ways with each other, leading to comparable competence as of monolingual children (Bhatia & Ritchie, 2004). This assumption has been affirmed by a number of studies. Simultaneous bilingual children attain the most fundamental stage of language development, particularly the lexical knowledge of fifty words and certain grammatical structures, at the same age as their monolingual peers (Bialystok, 2001; Bialystok, Craik, Green & Gollan, 2009). In the University of Cambridge's Bilingual Education Symposium, Katsos and Alexopoulou (2011) presented their work named Different Patterns of L2 Learning: Language, Cognition and Education, which synthesized and discussed the outcomes of scientific research on the field. If imparted rich language input, simultaneous bilinguals can achieve comparable proficiency as native speakers of both languages. However, the absolute vocabulary volume of simultaneous bilingual children would be as not large as that of monolinguals in either language. Besides, it would take simultaneous bilinguals more time to master complex morphological and syntactic rules than monolingual children (Katsos & Alexopoulou, 2011). Katsos and Alexopoulou (2011) also claimed that sequential bilinguals appear to be as successful as simultaneous partners in obtaining native-like competence supposed that they receive sustained and rich input. Nevertheless, there are contradictory results from other investigations that bilinguals have lower language performance compared with monolinguals (Hemsley, Holm, & Dodd, 2006; Leseman, 2000). More analyses with inconsistent outcomes with respect to the language development of bilinguals will be discussed more explicitly in the following parts.

Another major concern regarding the developmental process of bilinguals is the relationship between lexical knowledge and syntactic skills. Lexical development does associate with grammatical development and the relations are significant within each language and weaker cross languages (Conboy, 2002; Marchman, Martínez-Sussman, & Dale, 2004). Furthermore, it is indicated that lexical and grammatical associations within each language proceed similarly among bilinguals and monolinguals (Marchman, Martínez-Sussman, & Dale, 2004). There have been not so many analyses on the correlations between vocabulary and grammar development in bilinguals. One of the most noticeable shortcomings in those previous studies is that associations are identified based on the data in cross-sectional analyses, which just offers a snapshot of a single moment without considering what happens at other points of time. Conclusions about the relations between variables in the developmental process are better drawn from longitudinal data. The current study summarizes language development patterns of simultaneous bilinguals and sequential bilinguals in specific rather than of bilinguals in general with a proportion of data collected from longitudinal research.

This review aims to answer the following questions:

RQ1: How do simultaneous bilinguals and sequential bilinguals perform in vocabulary usage?

RQ2: How do simultaneous bilinguals and sequential bilinguals perform in grammar usage?

RQ3: What are lexical and grammatical associations in simultaneous bilinguals and sequential bilinguals?

III.METHOD ADD INCLUSION CRITERIA

1. Method

The current systematic review collects databases from academic journals. Psychology, linguistics, psycholinguistics and bilingualism are closely-interconnected fields. Therefore, in order to obtain as much evidence of the topic of bilingualism as possible, journals of linguistics, developmental psychology, psycholinguistics are all included. The journal list is shown in Table 1.

2. Inclusion Criteria

Studies are selected based on the criteria as follows:

1. As this is a systematic review, secondary research and meta-analyses are excluded, only primary research is investigated to collect first-hand resources. Primary research guarantees that the information collected is relevant and objective.

2. The main research method is experiment. Language research is basically cognitive research (Kecskes, 2005). The cognitive approach to bilingualism is employed to identify the effects of the two language involvement in interpersonal communicative processes. In cognitive studies, experiments should be conducted.

3. In some studies, participants are either simultaneous or sequential bilinguals together with monolinguals while in some

A Systematic Review of Language Development in Simultaneous Bilinguals and Sequential Bilinguals: An Exploration from Cognitive Approach

analyses, the sample includes both two categories of bilinguals and the group of monolinguals. In those research, the comparison of language performance between monolinguals and bilinguals would illustrate how bilinguals perform in different aspects of language more clearly. However, the focus of this systematic review is on the findings related to language development in bilinguals.

4. The included research incorporates the language development of bilinguals in two major aspects of language, namely grammar and vocabulary utilization, and associations between lexical knowledge and syntactic skills.

5. The time scale of searching is from 2000 to present. The field of bilingualism has gained greater attention from researchers and scholars since the early 21st century. A significant increase in publications in the area has been found over the past two decades (Lin & Lei, 2020).

IV. RESULTS

1. Inclusive Studies

Twelve studies that fit the inclusion criteria are selected to be systematically reviewed. All of the studies follow a cognitive approach. The employed paradigms vary in accordance with the language aspects that are measured. Specifically, to measure lexical knowledge of the subjects, standardized tests, of both receptive and expressive vocabulary, are utilized except for Kaltsa, Prentza and Tsimpli (2019). In this research, only expressive vocabulary tasks are adopted owing to the assumption that expressive vocabulary measure is better at characterizing language competence differences among groups of subjects compared to a receptive vocabulary measure would, as proposed by Thordardottir (2011). Sentence repetition and oral narrative tasks are adopted to examine participants' grammatical development. In regard to lexical and grammatical correlations, two studies with the samples of Spanish-English bilingual children use the MacArthur Communicative Development Inventory – Words and Sentences (CDI – WS; Fenson et al., 1993) and its Spanish language counterpart, the Inventario del Desarrollo de Habilidades Comunicativas – II (INV – II; Jackson-Maldonado et al., 1993, 2003). Two other investigations use storytelling and picture naming tasks to detect the relationship between vocabulary and grammar development among bilinguals.

The studies that examine lexical and grammatical associations are cross-sectional and longitudinal with an exception of Kaltsa, Prentza and Tsimpli (2019). The investigation conducted by Kaltsa, Prentza and Tsimpli (2019) is not a longitudinal one. The cross-sectional design is efficiently used to compare many different variables at the same time. In addition, the longitudinal approach enables measurements to be conducted at several points of time during a certain period, thus precisely detecting development or changes in the characteristics of the target population. Nonetheless, the longitudinal studies examining lexical and grammatical correlations, except Pham (2016), do not clarify the directionality of associations, which may be unidirectional or bidirectional.

2. Participants

Some studies compare three groups, monolinguals, simultaneous and sequential bilinguals. In some investigations, either simultaneous bilingual group or sequential bilingual group is compared with monolinguals in terms of language development. All reviewed analyses have a quite small sample size. The largest one is found in Thordardottir (2017) of 132 participants.

In most studies, the backgrounds of participants are described. All participants have no hearing and seeing problems, which is tested by a hearing screening task at the beginning of each experiment. Additionally, there are no records of language impairment, learning disabilities and behavioral disorders among subjects. Participants in different analyses have varied backgrounds with regard to the age at which they start learning the second language, length of exposure to languages and amount of language input, etc.

3. Stimuli

This review aims to summarise how simultaneous bilinguals and sequential bilinguals perform in grammar and vocabulary usage and the relationship between these two aspects. If one research investigated both simultaneous bilinguals and sequential bilinguals, it would be easier to compare these two groups. However, most of the included studies just analyze either simultaneous bilinguals or sequential bilinguals and compare them with the monolingual population.

4. Inconsistent Outcomes

It can be obviously seen that there are contradictory outcomes regarding the performance of two bilingual groups in terms of vocabulary and grammar development. Specifically, Gross, Buac & Kaushanskaya (2014) reported that simultaneous bilinguals outperformed sequential bilinguals in vocabulary; whereas, studies by Thordardottir (2017), and Kaltsa, Prentza and Tsimpli (2019) declared that two bilingual groups did not differ in their lexical abilities. Regarding syntactic skills, Roesch and Chondrogianni (2016) illustrated that simultaneous bilingual children performed better than sequential bilingual ones in grammar tasks. In contrast, in the research carried out by Kaltsa, Prentza and Tsimpli (2019), no significant differences were detected between the two groups of simultaneous and sequential bilinguals. The inconsistent findings could be accounted for by age differences among participants, exposure to language, language learning environment, employed tasks, etc. The explanation will be discussed in further detail in the next sections.

A Systematic Review of Language Development in Simultaneous Bilinguals and Sequential Bilinguals: An Exploration from Cognitive Approach

5. Performance of Simultaneous Bilinguals and Sequential Bilinguals in Vocabulary Usage

The results of research on bilinguals' lexical knowledge seem to be the most inconsistent. Chondrogianni and Marinis (2011) indicated that sequential bilinguals were less accurate in vocabulary standardized assessments compared to monolingual children. Simultaneous bilingual children were also reported to have lower performance than monolinguals on measures of vocabulary in single language comparisons (Hoff et al., 2011). However, on a measure of total vocabulary in this same study, simultaneous bilinguals scored comparably to monolingual participants. Another investigation by Thordardottir (2011) asserted that simultaneous bilingual kids performed similarly to monolinguals in receptive vocabulary tasks, but there were significant differences in the standardized test outcomes of the two participant groups in terms of expressive vocabulary.

The analysis conducted by Gross, Buac and Kaushanskaya (2014) examined both simultaneous and sequential bilinguals in comparison with monolinguals. The two bilingual groups were found to have much lower scores than monolingual children on single-language measures of English Vocabulary language-specific scores. Nevertheless, when it came to the measure of English receptive vocabulary with conceptual scoring, the simultaneous bilinguals' conceptual performance did not differ from the monolinguals' one. In Gross, Buac and Kaushanskaya's (2014) study, simultaneous bilinguals outperformed sequential bilinguals. Monolinguals' overall performance was better than both bilingual groups in an investigation conducted by Thordardottir in 2017. Contrary to the finding of Gross, Buac and Kaushanskaya (2014) about the difference in lexical knowledge between simultaneous and sequential bilingual learners, Thordardottir (2017) revealed that two categories of bilinguals did not systematically differ amongst each other in their performance. In a study by Kaltsa, Prentza and Tsimpli (2019), sixty eight-to-ten-year-old Albanian-Greek-speaking children were investigated. Simultaneous bilingual participants scored 34.7 out of 50 points and sequential bilingual participants scored 36.3 in a standardized expressive vocabulary task, which was then analyzed and concluded that there were no profound lexical gaps between the two bilingual groups.

6. Performance of Simultaneous Bilinguals and Sequential Bilinguals in Grammar Usage

Most investigations into grammar development of bilinguals utilized standardized tasks as means of measurement. Chondrogianni and Marinis (2011) presented that sequential bilinguals achieved lower marks in grammar assessments than monolingual individuals. The analysis by Montrul and Potowski (2007) recorded recurring results that sequential bilingual children produced more errors than monolinguals in grammar tests, particularly gender assignment and agreement tasks. Simultaneous bilingual kids were also reported to be less proficient than monolingually developing children in single language comparisons of syntactic skills.

When simultaneous and sequential bilinguals were compared with monolinguals, the monolingual group was more advanced than two bilingual ones in all grammar tasks (Roesch & Chondrogianni, (2016); Kaltsa, Prentza & Tsimpli, (2019)). Nonetheless, the findings of these two studies are dissimilar to each other with respect to grammar performance between simultaneous and sequential bilinguals. Roesch and Chondrogianni (2016) claimed that simultaneous bilingual participants were more accurate than sequential bilinguals in wh- question tests while it was proved that the performance in grammar usage was comparable between two bilingual groups, as stated by Kaltsa, Prentza and Tsimpli (2019).

7. Lexical and Grammatical Associations in Simultaneous Bilinguals and Sequential Bilinguals

Four of the selected studies analyze lexical and grammatical associations in bilingual children. The cross-sectional and longitudinal research of Conboy and Thal (2006) investigated the correlations between vocabulary and grammar development among sixty four twenty-to- thirty-month-old kids who learned English and Spanish simultaneously. This study found that lexical and grammatical relations were stronger within one language than across two languages. Hoff, Quinn and Giguere carried out an analysis in 2017, confirming the findings of Conboy and Thal (2006).

Kohnert, Kan and Conboy (2010) revealed more specific results indicating that vocabulary development was correlated positively and significantly with syntactic skills in the second language, but weaker associations were found in the native language domain. Also, no relationships were detected between vocabulary in one language and grammar in the other language among sequential bilinguals. The findings of Pham (2016) are in line with those of Kohnert, Kan and Conboy (2010). The hierarchical linear modeling during four years reported that lexical and grammatical associations were relatively stronger within the second language than within the first language. Moreover, it was noted that the correlations within one language were bidirectional and cross-language relationships were unidirectional in sequential bilinguals. Interestingly, Kaltsa, Prentza and Tsimpli (2019) demonstrated that there were significant positive correlations between vocabulary and grammatical abilities for simultaneous but not for sequential bilinguals while the findings of other studies emphasized different degrees of associations within and across languages.

V. DISCUSSION

1. Lexical Knowledge of Simultaneous Bilinguals and Sequential Bilinguals

Thordardottir (2011) illustrated that simultaneous bilinguals performed comparably to monolingual children in receptive

A Systematic Review of Language Development in Simultaneous Bilinguals and Sequential Bilinguals: An Exploration from Cognitive Approach

vocabulary. Another study conducted by Thordardottir in 2017 showed that monolinguals were better than bilinguals in overall vocabulary performance. In Thordardottir's (2017) research, when comparing simultaneous bilinguals with monolinguals, it only revealed the overall vocabulary performance without mentioning specific outcomes of expressive or receptive vocabulary tasks. Accordingly, there is no conclusive evidence to say the finding of Thordardottir (2011) that there were no significant differences between simultaneous bilinguals and monolinguals in receptive vocabulary contradicts the result of Thordardottir (2017).

Gross, Buac and Kaushanskaya (2014) declared that simultaneous bilinguals outperformed sequential bilinguals in vocabulary utilization. On the contrary, it was reported that two bilingual groups did not differ in their lexical knowledge (Thordardottir, (2017); Kaltsa, Prentza & Tsimpli, (2019)). The contradictory finding among these analyses could be perhaps explained by the age differences among participants. The studies of Thordardottir (2017), and Kaltsa, Prentza and Tsimpli (2019) examined lexical skills of bilingual individuals at an older age than the research by Gross, Buac and Kaushanskaya (2014). It is possibly inferred that the advantages of simultaneous bilinguals over sequential bilinguals thanks to earlier exposure to the second language were neutralized after several years of immersion education in the language tested. For this reason, simultaneous and sequential bilinguals did not differ amongst each other in vocabulary performance. Another explanation could be the maturity in cognitive abilities of individuals. Cognitive maturity would facilitate faster vocabulary acquisition (Golberg, et al., 2008). The more rapid rate of language acquisition would enable sequential bilinguals to catch up with simultaneous bilinguals, so the differences in performance between two groups of bilinguals were insignificant in studies by Thordardottir (2017), and Kaltsa, Prentza and Tsimpli (2019). Furthermore, although starting to learn an additional language later than simultaneous bilinguals, sequential bilinguals in Thordardottir (2017), and Kaltsa, Prentza and Tsimpli (2019) had a favorable language learning environment. Participants in Thordardottir's (2017) research live in Montreal, Quebec, where French and English coexist as two main languages with the same importance. In the investigation by Kaltsa, Prentza and Tsimpli (2019), all bilinguals are Albanian-speaking individuals living in Greece where Greek is the medium of education. Sequential bilinguals' exposure to L2 was intensive so the lexical gaps between sequential and simultaneous do not amount to much.

2. Grammatical Skills of Simultaneous Bilinguals and Sequential Bilinguals

The consistent finding across studies is that monolinguals outperformed two bilingual groups in grammar tasks (Roesch & Chondrogianni, (2016); Kaltsa, Prentza & Tsimpli, (2019)). This result sounds reasonable as monolinguals have more language exposure, in terms of both amount and timing, therefore, they would perform better than bilinguals whose exposure is allocated to two languages at the same time. The contradiction lies in the findings of Roesch and Chondrogianni (2016), and Kaltsa, Prentza and Tsimpli (2019). Simultaneous bilinguals gained higher grades than sequential bilingual children in grammar assessment, as reported by Roesch and Chondrogianni (2016), while grammar performance of the two bilingual groups was comparable in the research by Prentza and Tsimpli (2019). This could be attributable to differences in the employed tasks and the sample's age. Roesch and Chondrogianni (2016) just measured performance in one grammatical structure which might not be generalized to the performance of grammatical skills as a whole. And the comparison might not be as accurate as that of Kaltsa, Prentza and Tsimpli, in which participants were assessed based on performance in eight grammatical structures. Additionally, the inconsistent results of these two investigations could be accounted for by the age differences among participants. Roesch and Chondrogianni (2016) investigated children of four to five years old and the sample in Kaltsa, Prentza and Tsimpli's (2019) study included eight-to-ten-year-olds. After several years of intensive learning of the second language at schools with more advanced cognitive abilities, sequential bilinguals did not differ greatly from simultaneous fellows in grammar acquisition.

3. Lexical and Grammatical Associations in Simultaneous Bilinguals and Sequential Bilinguals

In spite of significant methodological differences, findings of research on lexical and grammatical associations are relatively consistent, which illustrates the strength of the word- grammar continuity phenomenon in the language development of humans. Analyses by Kohnert, Kan and Conboy (2010), and Pham (2016) repeatedly figured out stronger lexical and grammatical associations in the first language compared with in the second language. It could be understood that early phases of language development witness the most significant links between vocabulary and grammar skills, but the associations get weaker when abilities increase as language subdomains become more differentiated (Bates & Goodman, 1997; Moyle et al., 2007). Participants in the studies by Kohnert, Kan and Conboy (2010), and Pham (2016) were more proficient in their first language and beyond the initial stages of language development. Accordingly, the correlations between lexical knowledge and syntactic skills would be more robust for the newer and relatively weaker language - the second language, in comparison with the first language

The reviewed studies illustrate a weakening in lexical and grammatical relationships across languages. There are two plausible explanations for this finding. Firstly, bilinguals' sustained acquisition of one language considered as a minority language would be threatened by the other language of the majority community. As a result, the correlations between vocabulary and grammar development would become weaker across two languages. The measures of lexical diversity could be another factor leading to weakened lexical and grammatical associations across languages. A small volume of lexical items used to examine vocabulary knowledge could not guarantee proper measures of correlations between the development of vocabulary and grammar.

A Systematic Review of Language Development in Simultaneous Bilinguals and Sequential Bilinguals: An Exploration from Cognitive Approach

4. Suggestions for Future Research

It is essential that later research should be conducted with a larger sample size to ensure the generalizability of studies. Moreover, only four out of twelve studies examine both simultaneous and sequential bilingual in comparison with monolinguals. Future research should investigate all three groups so as to compare and contrast them more comprehensively. In addition, only one-third of the reviewed investigations that examine lexical and grammatical associations are longitudinal. It is important that analyses on language development, even if they do not investigate the correlations between two language aspects, should also be longitudinal as language development should be measured at several points of time.

VI. CONCLUSION

All in all, the reviewed studies support the following statements:

1. Sequential bilinguals have lower performance than monolinguals in terms of vocabulary; simultaneous bilinguals perform somewhat comparably to monolinguals do when it comes to receptive vocabulary.
2. Monolinguals outperform both simultaneous and sequential bilinguals in grammar tasks.
3. Lexical and grammatical associations are positive and strong within language but weaker across languages; stronger correlations are found within the second language than within the first language.

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A Systematic Review of Language Development in Simultaneous Bilinguals and Sequential Bilinguals: An Exploration from Cognitive Approach

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Table 1: Journal List for Article Searching

Category	Journal
Linguistics	International Journal of Bilingualism
	American Journal of Speech-Language Pathology
	Linguistic Approaches to Bilingualism
	Journal of Child Language
	Journal of Speech, Language, and Hearing Research
Psycholinguistics	Bilingualism: Language and Cognition
Developmental Psychology	Child Development
	Developmental Science

Table 2: Summary of Research for Review

	Study	Measured aspect	Participant/ Language	Task	Outcome
1	Kaltsa, Prentza & Tsimpli (2019)	Vocabulary, grammar, lexical and	- 60 8-10-year- old children (20 monolingual, 20 simultaneous and 20 late sequential bilinguals)	Sentence repetition task, standardized	- Vocabulary: No significant differences between simultaneous and sequential bilinguals

A Systematic Review of Language Development in Simultaneous Bilinguals and Sequential Bilinguals: An Exploration from Cognitive Approach

		grammatical associations	- Albanian - Greek	expressive vocabulary task	- Grammar: + Monolinguals outperformed the two bilingual groups + No significant differences between simultaneous and sequential bilinguals - Lexical and grammatical associations: Significant positive correlations for simultaneous but not for sequential bilinguals
2	Gross, Buac & Kaushan skaya (2014)	Vocabulary	40 English-speaking monolingual children, 39 simultaneous Spanish- English bilingual children, and 19 sequential bilingual children, ages 5-7	Standardize dreceptive and expressive vocabulary tasks	- English vocabulary language-specific scores: Monolinguals outperformed the two bilingual groups - English receptive vocabulary with conceptual scoring: No significant differences between simultaneous bilinguals and monolinguals - Simultaneous bilinguals outperformed sequential bilinguals
3	Thordar dottir (2017)	Vocabulary	- 64 children in first grade and 68 children in third grade (simultaneous bilinguals, sequential bilinguals, and monolinguals were equivalent in age) - English - French	Standardize deceptive and expressive vocabulary tasks	- Monolinguals outperformed the two bilingual groups - Insignificant differences between simultaneous and sequential bilinguals
4	Chondro gianni & Marinis (2011)	Vocabulary, grammar	43 Turkish- English sequential bilinguals, 33 age-matched monolingual English- speaking children	Standardize d vocabulary and grammar tasks	Monolinguals outperformed sequential bilinguals in both vocabulary and grammar
5	Conboy and Thal (2006)	Lexical and grammatical associations	- 64 20-30- month-old simultaneous bilingual children - English - Spanish	Standardize d vocabulary and grammar tasks	Significant positive correlations within each language but weaker cross languages
6	Hoff et al. (2011)	Vocabulary, grammar	47 English-Spanish simultaneous bilinguals, 56 English-speaking monolinguals	Standardize d vocabulary and grammar tasks	- Vocabulary: Monolinguals outperformed simultaneous bilinguals in single language comparisons but no significant differences between these two groups in total vocabulary - Grammar: Monolinguals outperformed simultaneous bilinguals
7	Hoff, Quinn & Giguere (2017)	Lexical and grammatical associations	90 Spanish-English simultaneous bilinguals	Standardized vocabulary and grammar tasks	Significant positive correlations within each language but weaker cross languages
8	Kohnert, Kan & Conboy (2010)	Lexical and grammatical associations	- 19 3-5-year- old sequential bilinguals - Hmong - English	Picture naming, story telling	Associations were relatively stronger within the L2 than within the L1

A Systematic Review of Language Development in Simultaneous Bilinguals and Sequential Bilinguals: An Exploration from Cognitive Approach

9	Montrul & Potowski (2007)	Grammar	60 English- Spanish sequential bilinguals, 29 monolinguals	Oral narrative, picture naming	Monolinguals outperformed sequential bilinguals
10	Pham (2016)	Lexical and grammatical associations	33 Vietnamese- English sequential bilinguals	Picture naming, story telling	Associations were relatively stronger within the L2 than within the L1
11	Roesch & Chondrogianni (2016)	Grammar	94 4-to-5-year-old children (32 German-speaking monolinguals, 32 French-German-speaking simultaneous bilinguals, 30 sequential bilinguals)	Picture selection task	- Monolinguals outperformed the two bilingual groups - Simultaneous bilinguals outperformed sequential bilinguals
12	Thordardottir (2011)	Vocabulary	84 5-year-old children (19 French-speaking monolinguals, 16 English-speaking monolinguals, 49 French-English simultaneous bilinguals)	Standardized receptive and expressive vocabulary tasks	- Receptive vocabulary: No significant differences between simultaneous bilinguals and monolinguals - Expressive vocabulary: Monolinguals outperformed simultaneous bilinguals



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