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A Conceptual Analysis and Variable Identification Study of First-Language Attrition

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A CONCEPTUAL ANALYSIS AND VARIABLE IDENTIFICATION STUDY OF FIRST-
LANGUAGE ATTRITION

by

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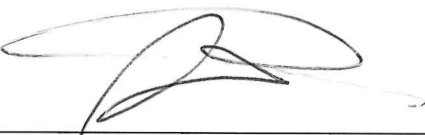


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A CONCEPTUAL ANALYSIS AND VARIABLE IDENTIFICATION STUDY OF FIRST-LANGUAGE
ATTRITION, a Doctoral research project prepared by NEIL EDWARD CANTRALL in partial
fulfillment of the requirements for the Doctor of Education degree in Educational Leadership.

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ABSTRACT

Children who grow up hearing and speaking one language and then begin learning another often experience first-language (L1) attrition. Existing research presents different theories regarding the process and the contributing factors of L1 attrition. However, the theories and factors are often dispersed throughout the literature with little coherent presentation. This makes it difficult for researchers and some practitioners to model L1 attrition with other variables properly. This study merged conceptual and content analysis through literature reviews to identify the relevant and essential variables that play a role in L1 attrition. I reviewed 54 textual sources which presented information or studies on L1 attrition in K-12 emerging bilingual students. I identified 15 variables that I argue are both necessary and jointly sufficient for future English Language Learner (ELL) research programs to heed. These variables include age, generational status, location of study, age of arrival into the second language (L2) setting, length of time spent in L2 environment, amount of L1 input in the home, frequency of L1 use, age of onset of bilingualism, external perceptions of L1 value, external pressure to focus on L2, student attitude toward L1, amount of L1 input at school, length of time in school in L1, cross-linguistic influence, and literacy skills in L1.

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Chapter 1

Purpose of the Study

The purpose of this study was to identify variables that researchers can use to build quantitative models of exploring and explaining the phenomenon of first-language (L1) attrition, as well as possibly predicting its onset. Research databases show that scholars and practitioners can examine many different factors regarding L1 attrition in K-12 students. However, more needs to be done to synthesize the variables that are essential to the task of this study. Using the Bernhardt (2017) framework of separating data into demographic variables, perception variables, student achievement variables, and school processes variables, I identified, analyzed, and evaluated 54 textual sources on the topic of L1 attrition in order to categorize the essential variables.

Problem of Practice

I have worked in multicultural education for the past two decades—both in the United States and overseas in South America and Southeast Asia—and have observed how students adapt and shift how they use language. Throughout my career as an educator and administrator, I have observed L1 attrition in both my students and those of the teachers I supervised. My professional development as an educator of English learners has always centered on three key elements: how to properly teach children as they learn L2, how to facilitate the language-learning process, and how to be culturally responsive. A critical missing piece of this development is how to better understand and care for students who experience L1 attrition.

According to fall 2019 data from NCES (2022), the percentage of public school students whose first language was not English (EL) was ten percent or more in twelve states. Half were located in the District of Columbia and the West. Additionally, the percentage of public school

students who were ELs was higher in the fall of 2019 than in the fall of 2010 in 42 states and the District of Columbia. This data indicates that our U.S. classrooms are rapidly becoming more linguistically and culturally diverse. While this is encouraging, we must consider that many students are setting aside their first languages to learn a second language, which is most commonly English.

According to the literature, almost all emerging bilingual students slowly lose abilities in L1 while learning L2, thus affecting different areas of their lives as they make L2 their focus (Wong Fillmore, 2000; Law, 2015). Educational leaders can benefit from understanding what the literature says and how often researchers mention certain demographic data as factors in L1 attrition. Much of what we know about L1 attrition points to L2 acquisition as the root cause, but practitioners will be able to see that there are other factors at play—some of which the research does not adequately cover. Learning more about how the research explains the process of child L1 attrition will give practitioners greater motivation to consider the implications of this phenomenon as it occurs in their L2-learning students.

While there is abundant research on how children learn L2, there is a lack of literature explaining the process of L1 attrition and how it affects students. Historically, researchers have given much attention to how children in K-12 schools learn a second language through immersion. Millions of students are entering U.S. classrooms with an L1 other than English. Educators, administrators, and school district leaders are putting forth significant effort through special programs to ensure these students receive support in the English-learning process (e.g., special funding, sheltered instruction, and dual language programs).

It is possible that there are many misconceptions, including from experts, about how to view L1 attrition. One example might be that many assume that students who begin learning L2

at a young age will inevitably lose significant command of their L1. While many students may experience an erosion of L1, the amount of L1 input received at home or the level of emphasis parents place on L1 retention may curb such attrition. Educational leaders worldwide who work with emerging bilingual children must be aware of what the literature says—or does not say—about how a number of variables affect L1 attrition in emerging bilingual K-12 students.

Humans rely heavily on language in various forms (verbal, sign, body) for communication, growth, and survival. Chomsky (2006) referred to the study of human language as “human essence” since we cannot separate them from any crucial stage of human development, as well as personal or social existence. Chomsky stated that we should view the everyday use of language as a creative activity due to its spontaneous and unpredictable nature. This idea is a distinguishing factor that separates human language from any known animal communication system. Chomsky (1957) even theorized that humans might be born with an innate understanding of how language works. This thinking became known as his “universal grammar theory,” which has been referenced by numerous researchers in linguistics, language acquisition, and language attrition.

Language acquisition, especially for children, has been the focus of numerous research studies. Many theories and studies exist on how children attain L2 and develop bilingual skills. The literature included in this study centers on the phenomenon of L1 attrition, which appears to be less popular among scholars and researchers. Since we know so much about how children learn L2, one might presume there should be more studies on the attrition of L1. The implications for children who experience this type of loss include but are not limited to, academic difficulties (Cummins, 2012; Escamilla, 2014; Genesee, 2006), special education misdiagnoses (Anderson, 1999), alienation from family (Wong Fillmore, 2000; Portes & Hao,

1998), and loss of cultural identity (Hsieh et al., 2020; Schechter & Bayley, 1997; Venturin, 2019).

Age, study location, generational status, and L1 input (L1 communication the child receives, either written or oral) are just four examples of important factors to investigate, given that they have face validity yet appear to suffer from a dearth of available literature to support educational leaders' decision-making. These variables might impact stakeholder perceptions of students, important learning outcomes, or other student behaviors or indicators for success. Students in international, temporary, third-culture contexts experience L1 attrition differently than those who permanently immigrate to a new country. If a child is the first member of her family to learn L2, both the child and her family will approach this learning with a unique motivation, depending on the family's circumstances (Tran, 2010). Older students often enter an L2 middle or high school strong in their L1, whereas younger children may not have fully acquired L1 before starting to learn L2. L1 attrition thus appears differently for each case (Cook, 2003).

Despite L1 attrition research on various language demographics, Spanish is the dominant language among K-12 ELL students in my surrounding school districts (Willamette Valley, Oregon); similarly, the most current statistics from the U.S. Department of Education (2015) showed that over three-fourths of ELLs spoke Spanish as their first language. While many of the selected research studies mentioned this language demographic, this paper focused on what research says about first language attrition of bilingual K-12 students in general, not that of one particular language group.

L1 attrition is also observed in the international school context. Data from ISC Research (2022) showed that as of July 2022, there were a total of 13,180 English-medium international

schools worldwide, enrolling 5.8 million students aged between 3 and 18. As more host-nation students enroll in international schools, the data also showed a rise in action to avoid L1 attrition. According to the data, 36% of international schools now offer learning in English and at least one other language (commonly the host nation's language), compared to 29% just five years prior. The experiences of students who undergo L1 attrition are unique to those who learn in their first language. While monolingual students must make a significant effort to learn their single language, the process for learners of a second (or third) language is complex and can look different for specific demographics.

The compartmentalization of the two languages then looks different for children who spent time learning their L1 in an L1 environment before beginning to learn L2 in a cross-cultural setting. Cummins (2012) stated that the more proficient a child is in L1, the more successful they will be in acquiring L2. His Linguistic Interdependence Hypothesis suggests that a child's second language competence partly depends on the level of competence the child has already attained in the L1; the more developed the L1, the easier it will be to develop L2. Thus, the retention of L1 will benefit a child academically.

Putnam and Sánchez (2013) defined heritage speakers as individuals who somewhat successfully acquire an L1 grammar of a language that is not socially dominant in a given geographical area. They then attain a high degree of fluency in L2, to the extent of it becoming their dominant language throughout the remainder of their lives. This means that what could be seen as L1 attrition for heritage speakers will not look the same for those who began learning L1 in an L1 context (Schechter & Bayley, 1997; Miller & Rothman, 2020).

There is much debate on how much L1 input is needed for a child to be considered linguistically proficient. Putnam and Sánchez (2013) discussed the challenges of determining the

necessary amount of L1 input a child receives, expressing the difficulty in determining whether a child's L1 acquisition is complete; researchers have proposed L1 attrition as an individual experience. Children or youths may feel quite strong in their L1 if they are not challenged in it, academically speaking. However, to a native L1 speaker living and studying in an L1 context, the individual would be viewed as lacking essential language skills. This misconstrued perception of L1 ability can significantly influence younger L1 attriters' cultural identities.

Significance of the Study

The paradigm wars in social science research extended itself into the 21st century. Thankfully, contemporary researchers have found ways to improve the methodological fit between some of the most pressing human problems and their potential solutions by using a modeling approach (Jaccard & Jacobi, 2020). Schaffer (2017) utilized the merger of macro-quantitative data with rich qualitative information to study epistemic networks in the education realm. Following the work of Lave and March (1995), Page (2018) has argued that the best way for researchers to truly understand a phenomenon is to use data modeling. Pearl (2009) is an excellent example where causal modeling, in particular, can be applied to investigate the complex arrangements and relationships across variables that represent a phenomenon.

Unfortunately, none of these approaches work if the correct variables are not identified. Problems arise in multiple regression models where lackadaisical or apathetic practices lead to multicollinearity (Gelman et al., 2020). Even in more conceptual modeling approaches, such as with logic modeling for program evaluation, misidentification of the correct variables can lead to misinterpretation and misunderstanding (Knowlton & Phillips, 2013). These and many other researchers and methodologists have consistently warned that the first crucial steps in modeling are variable selection, specification, and saturation. While Popper (1972) and Cappelen (2018)

warn against over-reliance on operationalism, it is still necessary to do one's due diligence for the purposes of advancing research and understanding by addressing the variable selection process head-on.

These modeling strategies and principles apply just as much to the field of English Language Learner education research. If the proper variables are not identified or understood, researchers and practitioners that rely on research will be unable to properly bring light to the L1 attrition phenomenon. Conceptual analysis is a key approach to identifying the appropriate variables (Jaccard & Jacoby, 2020). This is why my study was carried out. In other words, by combing the literature and beginning to identify the necessary and sufficient variables for inclusion in L1 attrition research, other researchers and possibly practitioners might be able to better model and therefore understand L1 attrition.

Ethical Considerations

Since no human subjects were involved in this content analysis, IRB approval was unnecessary. The vast majority of articles referenced in this paper were peer-reviewed. I worked to exhibit no bias when selecting articles by remaining aware of my personal experience with L1 Spanish speakers and not giving more attention to articles within that demographic. Furthermore, I made an effort to avoid interpreting data through my own eyes and remaining focused on the authors' methodologies and data. For example—since most of the immigrant students with whom I have worked in my educational career had a low socioeconomic status (SES)—when a study mentioned a student's or family's status as “immigrant,” I was careful not to assume this referenced a low SES, thus implicating it as a variable. I coded the data according to the domains and variables mentioned and avoided drawing personal conclusions.

Only reputable educational databases (i.e., ERIC, EBSCO, Taylor & Francis) were utilized while searching for articles on L1 attrition. Statistical data referenced in this paper were pulled from sources such as the National Center for Educational Statistics, [usa.gov](http://www.usa.gov), and the International School Consultancy (ISC Research). By using these databases and official sites, greater reliability of sources and accuracy can be assumed due to the rigorous processes each entity requires for publication. According to Fingfield-Connet and Johnson (2012), biases related to funding, methodology, and outcome are common forms of publication bias in educational research. They highlight that studies with large sample sizes are more likely to attract research funding, be submitted for publishing, and be published in reputable journals. It was important for me not to select solely studies of this nature to avoid this type of bias.

I worked with my chair throughout this project to ensure my writing was free of personal opinion. Additionally, I sought to reflect in the writing what was revealed by researchers, citing them appropriately. In many instances, it was necessary to locate and quote the primary source of information presented in a study instead of simply crediting the author citing the source. As recommended by Suri (2019), I made an effort to critically reflect upon the contextual position of the authors of the different primary research studies included in this review, the assumptions they are making, and how they could have possibly influenced the findings of the original studies.

Definition of Terms

Emerging/emergent bilinguals: Individuals in the developing stages of acquiring L1 and L2 who can tap into both languages as resources. Researchers and practitioners use this term as a way to reject the deficit-oriented terminology of limited English proficient (LEP), English language learner (ELL), English learner (EL), or English as a second language (ESL) students. (Weimer et al., 2019)

First-generation speakers: Individuals born in their L1 country to L1-speaking parents.

Second-generation speakers: Individuals born in the L2 country to immigrant, L1-speaking parents

Third (or higher) generation speakers: Individuals born in the L2 country to L2-born, L1-speaking parents.

L2 Environment: Any day-to-day environment where L2 is the dominant language inside and outside the classroom.

Immersion: Can be defined as a method for teaching and learning L2 where the individual is fully immersed in an L2 academic and social environment during the school day. This paper will also refer to the process of an L1 learner being placed into an L2 environment out of pure necessity.

L1 and L2: Used to refer to a person's first and second learned languages, respectively. L1 may also be exclusively referred to as one's native language.

L1 Attrition: L1 attrition, as explained by Schmid and Köpke (2017), will be understood as the process by which pre-existing linguistic knowledge becomes less accessible or is modified to some extent as a result of acquiring a new language, and L1 production, processing, or comprehension are affected by the presence of this other language. I summarized the literature on L1 attrition for K-12 students learning L2 or immersed in an L2 environment. The general attrition of a monolingual speaker's language is another topic that I avoided in this analysis.

Chapter 2

Methodology

I conducted searches for peer-reviewed articles and books in English on L1 attrition using the online library database PRIMO through George Fox University. Most queries led to popular online databases such as ERIC, EBSCO, Taylor & Francis, JStor, Gale, and Wiley. Since the initial searches for research on L1 attrition provided a large number of hits, I narrowed my focus by using more specific keywords and eliminating others. Table 1 shows which keywords were used and eliminated.

Table 1

Search Criteria

Included Criteria	Eliminated Criteria
bilingual development	adoption
bilingual school-aged children	adult L1 attrition
child L1 loss	adult language attrition
childhood language attrition	adult language loss
crosslinguistic influence	adult onset
dual language programs	aphasia
English immersion	boarding
first-language attrition	brain damage
heritage language loss	dementia
K-12 English learners	hearing
K-12 first language loss	impairment
L1 attrition	L2 attrition
L2 acquisition pre-adolescent	L2 loss
language loss	young adult
non-balanced bilingual development	
second-language acquisition	
second-language development	

I chose to eliminate certain words and phrases due to the foci of the articles improperly aligning with the focus of this study. For example, “adoption” was avoided. Many children who are adopted from foreign countries are brought into families at a very young age—often in

infancy—to live in a new cultural and linguistic context. Often, they must immediately begin learning L2—or the language of their adopted family—and set aside their L1. The experience of L2 language acquisition and L1 attrition for these children is a different topic of research that does not fall within the context of this paper. Fifty-four textual sources were reviewed that presented either information or studies on L1 attrition in children. A Google Sheet was used to record and store the sources collected. Cells were created to include five descriptive elements for each article: key ideas, title, author, permalink, and APA reference; this method partially aligns with the literature review strategies presented by Machi and McEvoy (2016).

The second step was to locate and record the different variables mentioned by the literature to be key factors when understanding L1 attrition. Throughout the process of combing the literature, 15 key variables were found. To categorize the different variables, I used Bernhardt's (2017) framework of compartmentalizing variables into four domains: demographics, stakeholder perceptions, student achievement, and school processes. As the variables surfaced in the different studies, they were placed into one of the four categories per Bernhardt's framework.

A variable was placed into the domain of demographics if it pertained to demographic data. Demographic variables that had to do with age or length of time spent in a given situation were included in this domain. The only demographic which fell into two different domains was the amount of L1 input received. Often, students received a large amount of L1 input at home if the parents were recent arrivals to the L2 country (immigrants) and had not yet gained command of L2 (Benmamoun et al., 2014). L1 input was also placed into the domain of school processes as there is generally no L1 input for students in traditional public settings.

Variables were placed into the domain of stakeholder perceptions if they dealt with a person's feelings or opinions regarding the process of language loss or the value of retention. For example, how one views the importance of L1 retention and the urgency to learn L2 for social survival is difficult to measure; however, perceptions such as these did surface in the literature as key variables in predicting L1 attrition. School processes contained three variables that were related to how much of a role schools were playing in the process of L1 attrition. For example, if a student is learning in L2 and there is no focus on the retention of L1 at school, this can be a major factor in L1 attrition (Schechter & Bayley, 1997). Dual language programs can help curb L1 attrition in students by providing them with extended learning in their L1 and deepening their literacy knowledge in L1, but this system typically switches to full English after elementary school.

For the final domain, student achievement, variables were included if they mentioned how educators or families used student achievement data to help understand or curb L1 attrition in children. Variables would also fall into this domain if they showed how examining student achievement would help prevent L1 attrition or indicate a relationship between L1 attrition and school performance. The study's goal was to gather all of the variables appearing in the literature examined and present them as a domain-specific list—per Bernhardt's (2017) framework—for researchers and practitioners to consider for studies or models for L1 attrition. Understanding which domains revealed the most and least variables will be useful for future researchers as they consider which ones to cover.

Research on adult L1 attriters was avoided as much as possible. The literature on adult attriters is different in that it deals with many other factors, such as immigration, career pressures, and significant family decisions that affect adults (Leeuw et al., 2012). Adult attriters

also have a much more developed L1—lowering their susceptibility to attrition (Park, 2018). While this strand of research is valuable, it does not speak to the aim I have outlined in this analysis; however, several articles on adult L1 attrition were included because they referenced the developmental process of language loss and related it to certain variables having to do with age; this data helped triangulate some findings on L1 attrition in children, where language loss foundations are present.

Tools and strategies presented in Neuendorf's (2017) *The Content Analysis Guidebook* provided support in acquiring useful sources, limiting unnecessary or duplicate database search hits, and the importance of coding information. By coding the literature and research findings according to four specific domains, this dissertation will serve as a categorized research analysis that practitioners, educators, and researchers can use to understand where specific gaps lie in the literature.

Findings

In this section, I explored what the L1 attrition research has revealed regarding the variables selected for this study. A total of 15 variables were identified in the literature; they were determined to be necessary and important for researchers to examine where L1 attrition in children is concerned. These variables are complex in that some overlap and show some degree of multicollinearity. By that, I mean that it is possible that two of the variables could be measuring the same thing; thus, a multiple regression model that includes both could end up with overestimated standard regression errors. The four domains of the Bernhardt (2017) framework (demographics, stakeholder perceptions, school processes, and student achievement) are the focus of this section. However, due to some variables being closely related to others, there are some instances when variables from different domains are discussed together.

Demographics

The domain of demographics yielded eight different variables: age, generational status, age of arrival into the L2 environment, length of time spent in L2 environment, location, level of L1 input in the home and everyday life, age of onset of L2 exposure, and frequency of L1 use. Several of these variables are interrelated, such as the level of input and frequency of L1 use; one often determines the other, yet perceptions and attitudes toward L1 can affect the frequency of use, despite the level of L1 input (Verdon et al., 2014). A person's age of arrival into the L2 environment and the age of onset of bilingualism are also closely related in that some researchers equated one's arrival into the L2 arrival as the moment of onset of bilingualism. One study conducted by Karayayla and Schmid (2019) stated that the age of onset of bilingualism was noted to be the day the participants in the study arrived in the L2 country (United Kingdom). This seemed odd in that it was unclear just how much L2 was known by the participants on the day of arrival, let alone how long it took them to acquire enough skills to be considered bilingual.

Examining the locations of studies on L1 attrition research is critical because students experience attrition differently, depending on their reasons for living in certain settings. Those in overseas, expatriate academic settings face unique challenges as they experience loss in L1. These students are not considered immigrants to a new country in these situations as their families temporarily move to these foreign locations, primarily for work or ministry-related reasons. On the other hand, many emerging bilingual K-12 students who experience L1 attrition lack schooling options.

Much of the L1 attrition literature included studies conducted on schoolchildren in the United States. While it is relevant to the topic, I wanted to see if there was any mention of

students losing their L1 in an expatriate context. As students learn to be dominant in L2 and lose abilities in L1, practitioners in expatriate schools must be aware of the impending shift in family dynamics and the long-term effects this “third culture” language experience has on students. Experiences such as these can be positive, but from my ten years of experience as a practitioner in these settings, the underlying perception is that students may become alienated from their nuclear and extended families (Wong Fillmore, 2000).

Kim (2015) published a study on a group of 93 Korean K-12 missionary students living in the Philippines, attending school in at least partial English. This offered a third-culture (L1 speakers, learning in L2, but living in L3 culture) example for L1 attrition. Sixty-two of these students received bilingual education (English and Korean) at an international school—learning in English in the mornings through an American-style method—and switching to Korean in the afternoons. The other thirty-one students attended a completely American-style international school in all English, with a majority of the student body being native speakers of English. The study found that the students who had more contact with their L1 retained a higher level of proficiency in that L1. Interestingly, the study also found that, despite their different levels of ability, both groups of students had the same motivation to learn and retain their L1.

Kim and Kim (2022) produced strong evidence that showed the variables of L1 input and length of stay in the L2 environment as predictors of L1 attrition. They studied 68 children living in South Korea whose native languages were Chinese or Russian. Their findings showed that the amount of time spent in Korea significantly increased their input of Korean as an L2, which combines the above-mentioned variables. These findings suggest that environmental factors such as time spent in the L2 environment greatly affect the amount of L1 input a child receives.

They also found that a child's age of acquisition of L2 did not play a significant role in their attrition of L1, which goes against what many researchers say to be a major predictor of L1 attrition. In this study, the researchers concluded that in order for attrition to occur, the child must have an already stable command of L1 before learning L2.

Chamorro et al. (2016) proposed findings that indicated an individual would be less likely to experience the effects of L1 attrition if reintegration into the L1 environment occurred after spending K-12 schooling years in an L2 context; this was the experience for a group of Spanish-speaking students studying in Scotland. This study showed that L1 attrition could be somewhat curbed or reversed if students returned to their home country after losing much of their L1 while studying in an L2 context. Elements of this were seen in Slavkov's (2017) study of a child who spent most of her life within the English-speaking environment of non-French-dominant Canada. The child appeared to show significant regression of her father's L1 (Bulgarian), but after spending ten days in Bulgaria to visit family, her Bulgarian skills actually began to resurface, indicating that what appeared to be a stagnation of Bulgarian language skills actually showed to be simply a suspension of those skills for some time. This study was particularly fascinating as the student's attrition was not heavily affected by her length of time in an English environment, despite her father's consistent input of L1. This study shows direct contrast to the study mentioned above by Kim and Kim (2022).

For students living in regions of the world, such as Western Europe—where multilingualism and multiculturalism are the norms—their potential for maintaining L1 may be higher. However, despite the numerous advantages of being bilingual in a global culture—or the research that additive bilingualism is an effective teaching strategy for academic excellence—students worldwide feel pressure to conform linguistically to English (Caldas, 2006; Rumbaut,

2009). Sigurjónsdóttir & Nowenstein (2021) noted that in Iceland, there is a public sentiment that the native Icelandic language is losing ground to the more globally popular English. The research also pointed to the fact that the widespread input and exposure of English (L2) through digital and social media might be blamed for this, as there is no national regulation within schools curbing its use.

Language input continually surfaced as a key variable of L1 attrition for children as they learn and gain dominance in L2 (Isurin, 2000). Flores (2012) noted that the language in which a child receives the least amount of input is less likely to be lost. In the case of the English-Bulgarian-speaking girl from Canada, her father gave her continuous input in L1; though the apparent aphasia of Bulgarian seemed evident, the skills in that language returned once she was placed into the full Bulgarian environment. If the father had not been offering continuous input in Bulgarian, it is assumed, according to Flores, that this language would not have returned to her so quickly and unconsciously.

It is fitting to note that the input variable was particularly difficult to classify due to the nature of it being subjective to a person's environment. For example, children whose parents work all day and into the evening may not have the same amount of L1 input as those whose parents are home when they return from school. Additionally, the type of input may potentially come from a digital source, such as social media or online video streaming. The effect of digital interfaces changes the conversation of L1 or L2 input in that it is not always dependent upon the parents or the school, but on the degree of access and exposure the individual has to these sources (Sigurjónsdóttir & Nowenstein, 2021; Mawarni, 2021).

Most researchers agreed that the benefits of bilingualism and maintaining L1 are numerous—even in English-dominated societies; however, even in societies such as these (e.g.,

the U.K., the U.S., and New Zealand), immigrant families focus most heavily on their children's L2 development (Law, 2015). The level of L2 input for students is naturally high when it is the country of residence's dominant language. Signage, television programming, visual media, radio, and food packaging provide continuous L2 exposure outside school. For the student living and going to school in a "third culture," the complexity of language input will affect the levels and nature of L1 attrition (Mitits et al., 2018; Spencer, 2022). Once again, the location variable of L1 attrition in research may help international school practitioners understand the different contextual factors associated with language loss in a third culture.

The case is even more complex for sequential bilinguals. Sequential bilinguals include children who grow up in an L1-rich home but are sent to school at an early age to learn in L2. L1 is then at least partially established before L2 is introduced. Those who learn L1 and L2 from the start are called simultaneous bilinguals (Tabor, 1997; Kaltsa et al., 2020). Differentiating the simultaneous from sequential bilinguals is critical when considering normative schooling problems such as attrition. Since many sequential learners never fully gain command of an L1 before beginning to learn L2, the behavioral process of attrition or loss needs to be looked at more closely. An improperly developed L1 will affect how a child learns L2, which is often the focus of schooling for sequential bilinguals. The attrition of an underdeveloped language was argued by Anderson (1999) to be detrimental to a child's overall grammar abilities in any language.

For early childhood sequential bilinguals, L1 development can be arrested or delayed because it is not fully developed before learning an L2 (Schiff-Meyers, 1992; Rothman, 2009). Schmid & de Bot (2013) also pointed out that L1 attrition is less prominently observed in individuals who have had full L1 exposure up through puberty than those who began learning L2

without fully mastering L1. As students enter the L2 environment in early childhood, a consequence of not properly learning L1 can be the attrition of that language. These variables of age, length of time spent in L1, and age of onset of L2 exposure intersect the domains of demographics and school processes. However, the age factor in L1 attrition proved valuable yet inconclusive by some researchers. For example, Yağmur (2004) stated that young informants in studies of L1 attrition often have not acquired L1 fully and cautioned researchers when labeling their lack of abilities as attrition or loss due to the incompleteness of language attainment.

Cook (2003) proposed the notion of multi-competence across languages, acting as a bridge between what many researchers used to call ‘interlanguage’ and general attrition, and therefore challenging the possibility that L1 development could cease. Most simultaneous bilinguals who begin life hearing and speaking both L1 and L2 would likely fall into this category. Attrition would be less likely if both languages were supported in academic and home contexts. Karayayla and Schmid (2019) suggested that individuals who abandon their native language environment before puberty seem more likely to experience a severe loss than those whose attrition onset occurred later in life.

The age of onset of bilingualism or L2 exposure becomes complicated when educators see L1 attrition in process without realizing what is happening. Due to the complexity of learning two languages at this young age, the speech patterns of L1 children may even resemble those of children with an actual language disability (Anderson, 1999). This misdiagnosis occurs when children lose productive skills in their native language while acquiring English. Educators must consider that referral to a speech pathologist may not be the correct first step in helping the child.

Kuhl et al. (2005) stated that this increased likelihood of attrition might be related to constraints of maturation imposed by puberty on language acquisition. This builds on

Lenenberg's (1967) Critical Period Hypothesis (CPH), which proposed the existence of a period of growth in which a person can attain complete native competence in a language. This particular period is thought to be from early childhood to adolescence. This hypothesis has implications for teachers and academic institutions, but not all accept it as valid. Kuhl et al. have similarly postulated the existence of an optimal window of time during individual development for acquiring L1 or L2, after which the acquisition of native-like fluency becomes more of a challenge. In terms of L1 attrition, this framework considers that a wide-scale erosion of one's L1 would be much more likely if attrition onset occurred before adolescence ended; this suggests bilingual students in K-12 classrooms may be at greater risk of losing or never fully acquiring their L1.

Children who do not fully acquire L1 before learning L2 risk losing L1. Their level of L1 input and exposure prior to learning L2 was seen as a significant risk factor for losing L1 or halting its development. Montrul (2008) and Park (2018) stated that in child language attrition, the age of onset of input loss and the amount of contact with the attrited language after the input shift are two main predictors of language loss. The younger the speaker and the lesser the input, the more likely attrition effects will appear. A similar picture emerges in handbooks on language development, where the focus is usually on the early stages of a child's life. This is because the foundations of language are known to develop in those early years. An inverse relationship has emerged between the increase in the age of a child and the number of studies devoted to language development at that age (de Bot, 2007, as cited in Köpke, 2007). As children begin learning L2, the complexities of language learning begin to have effects on L1, which can show evidence of attrition. Tsimpli (2017) argued that despite the influences the two languages have on one another, the signs of a person's understanding of the two tongues should not necessarily

be labeled as attrition. These shifts and adjustments may simply show that a speaker is developing a broader understanding of the two languages during the younger years or critical period.

Francis (2005) suggested that young children obtain the foundations of language in this critical period. Trafton (2018) summarized a study conducted at MIT where researchers explored the same idea of a critical period for language acquisition. The study determined children's aptitude for learning the grammar of a new language to be much longer than expected—up to age 17 or 18. On the other hand, the study also found that it is next to impossible for people to become proficient, similar to that of a native speaker, unless they begin learning a language by age 10. This means that a student's strong retention of L1 might be more plausible due to having a longer period of time to gain an understanding and mastery of said language.

Gorman (2010) shared that L1-attributing children who begin learning L2 without having a fully developed L1 should be viewed through a different lens; their supposed attrition may not be attrition at all if L1 was never fully developed. Ultimately, the experiences of children who undergo a loss of their first-learned language are affected by a myriad of variables that cannot be universally attributed to all attriters. Gallo et al. (2018) discussed the concept of first-language attrition by discussing controversies often associated with its definition. For example, they spoke of why it is important to understand what attrition is not. Attrition is not necessarily an intra-generational change but an individual process. Additionally, they emphasized that what many observe as a language shift should not necessarily be viewed as attrition. This shift refers to a morphing of language use which can be determined or affected by a person's adaptation to the L2 culture. Language shifts refer to the sociolinguistic aspect of usage, whereas language attrition indicates changes occurring at the cognitive/psycholinguistic level.

Emerging bilingual K-12 students' aptitude for learning L2 and avoiding L1 attrition may be affected by another demographic: their generational status. If a child's parents already have a working knowledge of L2, students tend to feel more familiar with it as they enter school (Portes & Hao, 1998). This is generally not the case for children who move to an L2 country and whose parents do not have a working knowledge of L2. Students whose parents grow up in the L2 environment but still have a solid understanding and make frequent use of L1 are more likely to have an L2 focus and not maintain the parents' L1 into adolescence or young adulthood (Rumbaut et al., 2006).

First-generation students were seen to be less likely to attrite due to the nature of their homes being categorized as an L1-rich environment. Tran (2010) wrote of this reality when comparing first-generation students to those of second and third generations. Second and third-generation L2 learners were found to be more likely to lose L1 due to the lack of use of L1 in the home. It was even stated that first-generation L2 learners would learn some L2 but retain L1 as their primary and preferred method of communication. Sorace (2020) proposed that distinguishing between first and second-generation attriters in terms of scope and stability is crucial as it appears to make a difference in how the attrition is viewed. The first-generation attriter receives more L1 input at home, whereas the second may receive less, depending on how much importance the family places on L1 retention.

The international context offers a different perspective, as parental motivation for a student's mastery of L2 accompanies social pressures for college acceptance overseas and future career success. Again we look at the example of the Korean-speaking student living in a "third" culture mentioned above. In this context, the student is highly likely to learn and study in English as a stepping stone toward eventual entrance into an English-speaking university. Additionally,

there is a high likelihood of extra-curricular L1 opportunities—math or literacy classes in L1 offered to the child—paid for by parents. If this international student is a first-generation L2 learner, the possibility of L1 attrition still exists but may look different based on opportunities afforded to the child along with motivational factors.

Research by Rumbaut et al. (2006) showed the survival rate of L1 (Spanish) for immigrants to the U.S. in different generational increments. The findings show that the level of L1 retention was much higher—35% of Mexicans, 29% of Salvadorans and Guatemalans, and 13% of other Latin American countries—in the first generation. After the second generation, the retention rate of L1 significantly dropped to no higher than 6%. Thus, L1 attrition would be less likely for the first generation than for those in the second and beyond.

Age-related variables, in general, were considered major contributors to L1 attrition, but much depended on their length of time in the L2 environment, age of arrival, and amount of L1 use and input (Miller & Rothman, 2020). Schmid et al. (2013) asserted that children who have full exposure to L1 up through puberty would be less likely to attrite than those who began learning L2 without fully mastering L1. The greater the L1 exposure and the greater the amount of L1 input seemed to be a common theme when comparing L1 attrition with L1 retention. A large number of researchers, such as Francis (2011), Friedmann & Rusou (2015), Hakuta et al. (2003), and Kuhl et al. (2005), referenced Lenenberg's (1967) updated Critical Period Hypothesis in which children generally have a specific window of time (age two through adolescence) for optimal language development. It was made clear that students experience L1 attrition at various ages relative to their learning experiences. The L1 attrition research often omits age-limiting factors such as the student's grade level or age. It is essential to consider a child's age because their level of L1 attainment will likely be higher the longer they remain in an

L1 environment; more time learning in L1 provides a more solid linguistic foundation.

Moreover, with a solid L1 foundation, L2 mastery can be easier to attain and L1 less likely to be lost (Cummins, 2012; Genesee, 2006; Park, 2018).

All in all, variables within the domain of demographics appeared most often in the literature. Apart from age-related factors, researchers agreed that the amount of L1 input a child receives played a significant role in whether or not L1 was maintained. However, according to Putnam and Sánchez (2013), the amount of input considered to be sufficient was difficult to calculate. The length of time spent in an environment where L1 is used was also widely regarded as a contributing variable to L1 loss. When a child is removed from that environment, their use of L1 decreases and thus begins to erode. Schmid et al. (2013) stated that if a child is exposed to full L1 use up through puberty, the risk of attrition is much less.

School Processes

The following domain discussed is that of school processes, which yielded three significant variables: amount of L1 input at school, length of time in school in L1, and cross-linguistic influence. The amount of L1 input at school showed multicollinearity with the input factor in the domain of stakeholder perception as it involved the amount of L1 input received at home; both contexts showed occurrences of L1 input or lack thereof. Two of the three variables from the domain of school processes were related to the amount of time a child spent in an L1-rich environment. L1 input at school and length of time spent in L1 schooling are somewhat related, yet the former referenced the amount of L1 input a child receives in an L2 schooling setting. In contrast, the latter generally referred to time spent in one's home country or language environment. The argument was that there is next to no L1 input for most emerging bilinguals at

school, which leads to the gradual erosion of that language (Schmid, 2013; Brehmer & Treffers-Daller, 2020).

L1 attrition often occurs in children when they are exposed to L2 in a full-time school setting. If schools do not view L1 as beneficial for the student, their level of input of L1 naturally decreases. As referenced by Cummins (2012), Genesee (2006), and Bialystok (2018), dual language programs—which are almost exclusively offered in Spanish and English—were seen as excellent supports for ELs whose parents desire for them to retain their L1 as they learn L2; however, the availability of these programs for students who can benefit from them has become more limited. Schechter & Bayley’s (1997) research spoke of Spanish-speaking parents’ strong desire for their children to remain strong in Spanish while learning English but understood it was not the school’s job to be in charge of this. If parents view L1 as a valuable asset for students, Schechter and Bayley noted that students would be less likely to attrite. While this variable of parental focus on L1 maintenance falls into the category of stakeholder perceptions, it is relevant to mention in the context of school processes.

Even though dual-language programs—where students learn in both Spanish and English—are available in the public sector, their increasing popularity among non-native Spanish speakers has made it more difficult for families of lower SES to access them. These programs were designed to serve as a resource for L1 Spanish-speaking students to receive instruction in their native language. These school programs—mostly Spanish and English—use the partner language for roughly half of the school day in the elementary years (Dual Language Education of New Mexico, 2023); they generally start in kindergarten or first grade, extend for at least five years, and many continue into middle and high school. Most dual language programs are located

in neighborhood public schools, although many are charter, magnet, or private. School processes, therefore, have been shown to play a critical role in a child's L1 maintenance.

Freire and Alemán (2021) showed that dual-language programs are now viewed as a way for all families, by way of lottery, to advance their children's education by learning an L2. This created more challenges for certain families who desire their children to maintain their L1. As mentioned earlier, since higher SES, non-native Spanish-speaking families are placing their children in these programs, fewer seats are available for L1 Spanish-speaking students who need them most. Flores and García (2017) even stated that these programs had been labeled “boutique programs,” marketing bilingualism to powerful consumers. Most students do not have this option when entering a new linguistic environment because the amount of dual language instructional needs outweighs the availability of such programs. However, recent research indicated that these programs now appear to focus more on globalization—giving native English-speaking students the opportunity to immerse themselves in L2—instead of meeting the needs of those who desire to strengthen their L1 (Bialystok, 2018; Cummins, 2012; Sun, 2019). As the families of emerging bilingual students begin to realize these programs are becoming less accessible to them and are being offered to native English-speaking children, it becomes increasingly challenging for them to land a spot in one of these often competitive schools.

In many cases, public schools' processes aim to support both bilingual and lower SES students through various district-funded programs such as after-school tutoring, summer school, and sheltered instruction; however, these programs generally focus on supporting the health and well-being of a child and—if bilingual—their acquisition of L2. Lower SES families must be content with what is offered by the public system due to other options (private schools) being largely out of reach; the cost of specialized schooling is too high for parents with low to mid-

economic status. Suppose parents wish for their children to attend school and maintain their L1 in an L2 or L3 environment, but a dual language model is not available to them through the public system. In that case, they must prepare to pay fees and monthly tuition at a private school. Immigrant families are often faced with this reality, as well as those living in an expatriate context.

For example, native English-speaking expatriate families generally wish their children to maintain their L1 while living abroad. In almost every non-English dominant country, American-style schools in full English are expensive. Suppose a French family immigrated to the United States and wanted their children to continue attending school in French. Schools like this exist but are private with very high tuition. Generally, only families with a higher SES can afford to send their children to these types of schools. Schechter and Bayley (1997) conducted four intensive case studies on Mexican-descent families in California and Texas. Their findings showed that all the parents they interviewed wished for their children to maintain their L1 (Spanish). However, they could not rely on the public school system to help with this. These families were not in a position to pay for private schooling and had to do what they could to help their children practice at home. Students who immigrate with their families to a new country are generally given one choice, which is offered in that country's dominant language.

Some students grow up speaking L1 at home but attend school in L2. Austin et al. (2013) call this a subtractive language environment. When L2 becomes more dominant, and students shift their language-learning foci, their skills in L1 begin to diminish. An environment is categorized as non-subtractive if the student receives educational support and instruction in their L1. Schools play a critical role in the attitudes of students in relation to their L1. If schools do not place any emphasis on a child's L1 maintenance—or give attention to the process of L1

attrition—Austin et al. would classify this could be considered a subtractive language environment.

Additional research showed L1 attrition occurring for students in European countries but did not mention the role of schools. Mitits et al. (2018) referenced a study of Turkish-speaking bilinguals who immigrated to Greece. The families tended to speak as much L2 (Greek) in the home to improve their children's L2 acquisition; the intent was to help them assimilate better into the L2 culture. The study found, however, that despite their assumption of L1 attrition being part of the process of assimilation and acculturation, maintenance of L1 in the home benefitted the children's acquisition of Greek. Since there was no Turkish support for the students in schools, it was the family's responsibility to help the child maintain L1. This element of school processes, as laid out by Bernhardt's (2017) framework, lets us see that the amount of emphasis that schools place on the maintenance of L1 acts as a considerable variable for students' potential to attrite, as well as their potential for academic achievement (Escamilla, 2014; Genesee, 2006; Bialystok, 2018; Cummins, 2012). According to Wong Fillmore (2009), L1 attrition is not a new problem for children learning L2. As students learn L2, they use it more and more until it becomes their dominant language. School is where children spend most of their waking hours—more time with their teachers than with their parents—and their experiences in that environment will shape many different aspects of their language development (Portes & Hao, 1998).

Cross-linguistic influence was referenced as a factor in L1 attrition when L2 begins to confuse the learner, lowering grammar abilities in L1. Köpke and Schmid (2007) referenced this on multiple occasions. Schmid (2013) defined CLI as the effect of one known language upon another. They even stated that all bilinguals are attriters in some fashion due to both languages inevitably having effects on each other concerning grammar, comprehension, and availability.

However, it must be noted it is challenging to place CLI into one single domain due to the fact that a person's L2 influence on L1 occurs in multiple arenas (social, sports, school, activities, clubs). Bolonyai (1998) spoke of a similar phenomenon referred to as "code-switching," where an individual begins to add elements of their L2 to their L1 en route to the erosion of L1. Though these two phenomena are somewhat unique, I have placed them into the same variable category as cross-linguistic influence due to the nature of one language having an effect on the strength of the other.

Stakeholder Perceptions

The three variables falling into the domain of stakeholder perceptions included: parental perceptions of L1 value, external pressure to focus on L2, and student attitude toward L1. These three variables seem to work hand in hand due to the potential of parental influence affecting a child's attitude towards L1. However, Wong Fillmore's (2000) article clearly pointed out that despite their parents' desire for them to retain and use L1, many emerging bilingual children see the societal pressures of learning English (in a U.S. context) and gravitate towards it at a young age. Schechter and Bayley's (1997) research showed that many parents of bilingual children long for their children to maintain L1 because, without it, they become distanced from extended family. One family in the study even equated L1 attrition with attrition of culture, which is a serious consequence of losing one's first language (Wong Fillmore, 2000).

Attrition for students in an immigrant context will vary as it depends on the use and intensity of the L1 in the home. Stakeholder perceptions play a huge role in how students view their L1. If L1 is viewed by parents or caregivers as a key element of family cohesion and culture, students may be less likely to attrite (Law, 2015). Even so, as Law also pointed out, a student's attitude towards L1 may not reflect that of the parents and could lead to a distancing

between parents and children. In a setting where students are in a foreign culture where the dominant language is one other than that which they are learning, the pressure to learn the language of schooling will affect the level of attrition. Kouritzin (1999) stated that the child's break from their home country would greatly affect their level of attrition as it affects their personal identity as well. For example, a Korean-speaking expatriate living in Indonesia but attending school in English will experience L1 attrition for different reasons than a Mexican immigrant living in the United States. As a former international school administrator, I have had many conversations with Korean parents—either during the admission process or at a graduating student's exit interview—who view the immersive setting as a benefit to the child's future and treat it as an investment. The child's motivation to learn L2 was fueled by that of the parents. Learning L2 was then embraced by the child as a challenge; it was seen as a benefit rather than a tool for family social survival. L1 attrition still occurred for these children but was viewed positively in many aspects.

Motives for maintaining L1 may differ if parents view their child's L1 through the eyes of it being non-beneficial to their children's future. Many first-generation students must learn L2 quickly and successfully to be successful in school and in the working world, as they will likely remain in the L2 environment for at least the rest of their young adult lives (Schechter & Bayley, 1997). For the immigrant child placed in a U.S. public school, learning L2 is also a family decision; but the motivation is often the advancement of the family. While the maintenance of L1 is important to these families, it is not seen as a necessity and can even be viewed as a barrier to the child's educational success and social integration (Wong Fillmore, 2000). Maintaining L1 can become a burden in the eyes of immigrant parents who see the obvious benefits of their children acquiring English well. Since public schools will not take the lead in preventing L1

attrition, this responsibility is placed on parents (Schechter & Bayley, 1997). The threat of L1 attrition ends up not being significant enough for them to intervene.

For the first-generation Mexican immigrant student learning L2 (English) in the United States, the motivation to learn L2 is not only for future success and eventual university acceptance but also for social survival (Brehmer & Treffers-Daller, 2020). Wong Fillmore (2000) asserted that these immigrant students view learning English as essential to adopting the often unspoken American ideal: to be American, one must speak English. Even though these students see their L2 acquisition as pioneering, they will generally have a higher level of L1 retention because it is the dominant language in their homes (Park, 2018). Benmamoun et al. (2014) supported this idea stating that once children understand that their home language is a minority language and is not spoken beyond the home, they shift to the majority language spoken by their peer group. These students' attitudes and perceptions toward L1 shift over time, manifesting a desire to distance themselves from L1. While many assume that students with more negative attitudes or associations with their L1 will experience more attrition of that language while learning a second one, the data is inconclusive. Findings show that attitudes such as these are developed and molded over a lifetime, not just during a child's schooling years (Schmid, 2013).

Law (2015) presented a study on Chinese families who immigrated to the U.S. and witnessed similar language attrition in their children. Their desire for their children to learn English took precedence over their behavior to learn or maintain Chinese (L1). Though parents wished for their children to learn and maintain L1—for numerous reasons—they merely interpreted their language loss as a lack of benefits. Law went on to state that few families have

realized that the loss of the home language can mean significant social and cultural losses for the entire family, not just the student.

Student Achievement

Within the domain of student achievement, only one significant variable was mentioned, which was a student's literacy ability in L1 or home literacy environment. Goodrich et al. (2017) noted that a well-developed L1 literacy level—as measured by Cummins' (1981) common underlying proficiency model—will help a student retain L1 due to the skills mastered in L1 at the academic level. Cummins (2012) noted that students' retention of L1 leads to increased levels of school performance and that L2 should not be the sole focus of language learning. Park (2018) also notes that strong literacy skills in L1 can be a predictor of L1 retention. Park also stated that “well-developed literacy skills are thought to be important in helping to attain the critical threshold beyond which language is resistant to attrition.” It was then noted that children who have attained higher skills in writing in L1 show less susceptibility to the attrition of the language. This aligns well with Schmid et al.'s (2013) assertion that the stronger one's skills in L1, the less prone to attrition that language will be.

The literature showed that L1 attrition in bilingual students can negatively affect their mastery of a second language and overall academic development (Cummins, 2012; Genesee, 2006), ability to communicate with immediate and extended family (Schechter & Bayley, 1997), and cultural identity (Wong Fillmore, 2000; Hsieh et al., 2020). While many non-native English-speaking families desire their children to master the English language while attending full English instruction (Butler, 2015), finding ways to build bridges between L1 and L2 continues to be a struggle, especially within schools. Furthermore, understanding what research says about

specific age levels as they deal with L1 attrition will add clarity to the debate on whether there truly are critical periods for language acquisition and attrition.

Essentially, the greater a student's literacy skills in L1, the lesser the likelihood of L1 attrition (Park, 2018). Language mastery and complete acquisition were equated to literacy skills. This imbalance of variables mentioned in this domain will make it difficult for researchers to model as they look to show the impact of L1 attrition as they relate to student achievement, specifically. In contrast, Bylund (2009) proposed that his research has not concluded there to be any link between a child's literacy ability and their L1 retention or susceptibility to L1 loss. The research appeared to focus on the fact that most of the variables affecting a student's level of L1 attrition are external and not dependent on the student's level of academic achievement. Genesee (2006) and Cummins (2012) gave great support to the theory that students who maintain a strong command of L1 will be more successful in not only acquiring L2 but in their overall academic development. Cummins stated that the two languages act interdependently and that knowledge and maintenance of L1 support the learning of L2 and beyond. While much of Cummins' and Genesee's research focused on the importance of a child's L1 maintenance and retention, their assertions aligned directly with the problem of child L1 attrition; their views of academic implications for L1 loss helped support this domain of achievement variables.

Summary

Table 2 offers a condensed view of the different variables that surfaced in the literature and shows which domains into which they were placed.

Table 2*Domains with Variables*

Domain	Variables identified
Demographics	age generational status location of study amount of L1 input in the home age of onset of L2 exposure age of arrival into L2 environment length of time in L2 environment frequency of L1 use
Stakeholder perceptions	external perceptions of L1 value external pressure to focus on L2 student attitude toward L1
School processes	amount of L1 input at school length of time in school in L1 cross-linguistic influence
Student Achievement	literacy skills in L1

Table 3 identifies which authors (of the 54 textual sources) reviewed variables that fell into each domain of Bernhardt's (2017) framework.

Table 3*Author Map by Domain*

Demographics		
Ahn et al. (2017); Anderson 2001); Benmamoun et al. (2014); *Brehmer & Treffers-Daller (2020); Bylund (2009a); Bylund (2009b); Bylund et al. (2010); *Bolonyai (1998); *Domínguez (2013); Flores (2012); Flores (2015); Francis (2005); Francis (2011); Friedmann & Rusou (2015); Gorman (2010); Guardado (2002); Hicks & Domínguez (2020);	*Hsieh et al. (2020); Isurin (2000); Karayayla & Schmid (2019); *Kim (2015); Kim & Kim (2022); Köpke & Schmid (2007); Mawarni (2021); Miller & Rothman (2020); Mitits et al. (2018); Montrul (2008); Pallier (2007); *Parameshwaran (2015); *Park (2018); *Portes & Hao (1998); Putnam & Sánchez (2013); Rumbaut et al. (2006);	*Schecter & Bayley (1997); *Schmid (2013); Schmid et al. (2013); *Schmid & Köpke (2017); *Schmitt (2004); Sigurjónsdóttir & Nowenstein (2021); Slavkov (2015); Sorace (2020); *Tran (2010); *Venturin (2020); *Verdon et al. (2014); *Wong Fillmore (2000); Yağmur (2004)
Stakeholder Perceptions		
*Anderson (2001); Bolonyai (1998); Bylund (2001); *Cummins (1991); Guardado (2002); *Hsieh, B. et al. (2020); Kouritzin (1999); *Law (2015);	Mawarni (2021); Mitits et al. (2018); * Parameshwaran (2015); *Portes & Hao (1998); *Schecter & Bayley (1997); *Schmid (2013); *Schmitt (2004);	Schiff-Meyers (1992); *Tran (2010); *Venturin (2020); *Verdon et al. (2015); *Wong Fillmore (2000)
School Processes		
Ahn et al. (2017); *Anderson (1999); Anderson (2001); Austin et al. (2013); Benmamoun et al. (2014); *Bolonyai (1998); *Brehmer & Treffers-Daller (2020);	*Cummins (1991); *Cummins (2012); *Domínguez (2013); Gürel (2017); *Kim (2015); *Law (2015); *Portes & Hao (1998); *Schiff-Meyers (1992);	*Schmid (2013); *Schmid & Köpke (2017); *Schmitt (2004); Smolkin & Suina (1996); *Venturin (2020); *Wong Fillmore (2000)
Student Achievement		

Cummins (1991);
*Cummins (2012);
*Park (2018);
Riches & Genesee (2006)

Note. * = Authors appearing in multiple demographic domains

Table 4 presents the four different domains with their respective variables. Each variable is grouped with the authors that referenced them in the literature.

Table 4*Author Map by Variable and Domain*

	Demographics
age	Ahn et al. (2017) Anderson (2001) Benmamoun et al. (2014) Bylund (2009a) Bylund (2009b) Bylund et al. (2010) Flores (2012) Francis (2005) Francis (2011) Gorman (2010) Hsieh et al. (2020) Kim & Kim (2022) Montrul (2008) Pallier (2007) Parameshwaran (2015) Park (2018) Putnam & Sánchez (2013) Schmid et al. (2013) Schmitt (2004) Sorace (2020) Yağmur (2004)
generational status	Anderson (2001) Brehmer & Treffers-Daller (2020) Parameshwaran (2015) Portes & Hao (1998) Rumbaut et al. (2006) Schechter & Bayley (1997) Sorace (2020) Tran (2010) Wong Fillmore (2000) Venturin (2020) Yağmur (2004)

location of study	Ahn et al. (2017) Anderson (1999) Anderson (2001) Bylund (2009a) Bylund et al. (2010) Flores (2012) Kim (2015) Law (2015) Mitits et al. (2018) Portes & Hao (1998) Schechter & Bayley (1997) Sigurjónsdóttir & Nowenstein (2021) Rumbaut et al. (2006) Verdon et al. (2014)
amount of L1 input in the home	Brehmer & Treffers-Daller (2020) Benmamoun et al. (2014) Bylund (2009b) Bylund et al. (2010) Flores (2012) Francis (2005) Guardado (2002) Hicks & Domínguez (2020) Hsieh et al. (2020) Isurin (2000) Mawarni (2021) Mitits et al. (2018) Portes & Hao (1998) Putnam & Sánchez (2013) Rumbaut et al. (2006) Schmid & Köpke (2017) Slavkov (2015) Tran (2010)

age of onset of L2 exposure	Ahn et al. (2017) Anderson (2001) Bylund (2009a) Bylund et al. (2010) Domínguez (2013) Flores (2015) Gorman (2010) Hsieh et al. (2020) Karayayla & Schmid (2019) Montrul (2008) Putnam & Sánchez (2013) Schmid & Köpke (2017) Schmitt (2004)
age of arrival into L2 environment	Miller & Rothman (2020) Parameshwaran (2015) Schechter & Bayley (1997) Schmid et al. (2013) Schmid & Köpke (2017)
length of time in L2 environment	Ahn et al. (2017) Benmamoun et al. (2014) Kim & Kim (2022) Parameshwaran (2015) Park (2018) Portes & Hao (1998) Schechter & Bayley (1997) Slavkov (2015) Wong Fillmore (2000)
frequency of L1 use	Anderson (1999) Bolonyai (1998) Bylund et al. (2010) Flores (2015) Park (2018) Schechter & Bayley (1997)
Stakeholder Perceptions	
parental perceptions of L1 value	Guardado (2002) Hsieh et al. (2020) Law (2015) Parameshwaran (2015) Schechter & Bayley (1997) Schmitt (2004) Wong Fillmore (2000)

external pressure to focus on L2	Wong Fillmore (2000) Kouritzin (1999)
attitude toward L1	Anderson (2001) Bolonyai (1998) Bylund (2009a) Guardado (2002) Hsieh et al. (2020) Law (2015) Mawarni (2021) Mitits et al. (2018) Parameshwaran (2015) Park (2018) Portes & Hao (1998) Schechter & Bayley (1997) Schiff-Meyers (1992) Schmid (2013) Schmitt (2004) Tran (2010) Venturin (2020) Verdon et al. (2014) Wong Fillmore (2000)
School Processes	
lack of L1 input at school	Anderson (1999) Anderson (2001) Austin et al. (2013) Benmamoun et al. (2014) Bolonyai (1998) Kim (2015) Law (2015) Montrul (2008) Portes & Hao (1998) Schiff-Meyers (1992) Smolkin & Suina (1996)
length of time in school in L1	Ahn et al. (2017) Benmamoun et al. (2014) Schmitt (2004)

cross-linguistic influence	Austin et al. (2013) Benmamoun et al. (2014) Bolonyai (1998) Brehmer & Treffers-Daller (2020) Montrul (2008) Schmid (2013) Schmid & Köpke (2017) Sigurjónsdóttir & Nowenstein (2021)
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Student Achievement

literacy skills in L1	Cummins (1991) Cummins (2012) Park (2018) Riches & Genesee (2006)
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Chapter 3

Limitations

Since I was limited to textual sources in English, I was not able to use L1 attrition literature in other languages. It is assumed, however, that within the realm of language attrition research, there are studies available in multiple languages other than English. Much of the literature reviewed involved both language attrition and acquisition. It was important to focus on the degree to which L1 attrition was discussed due to the focus of this study. On the topic of language attrition, there were considerable sources that surfaced discussing L2 attrition. This was mainly discussed in the context of individuals who spent time in a foreign setting and then returned to their home countries. Branches of language attrition research such as this are indeed valuable and useful for practitioners and researchers, but since the focus of this study was on L1, I passed over the great majority of these articles.

Sometimes it was necessary to use search criteria that referenced L2 acquisition due to the presence of discussion and research regarding L1 attrition. Since they go hand in hand, according to many researchers, this proved to be a valuable strategy when looking for textual sources on L1 attrition or the difficulty of L1 retention. Some useful sources were located in physical books, to which I either did not have immediate access or enough information based on what was presented online. Some of these sources, however, did prove to be useful in that their texts were well-described and reviewed in online databases.

A large portion of the information presented in the selected textual sources centered around students in cross-cultural situations—the context in which most of my career as an educator has been focused. Naturally, the scenarios and studies presented in sources such as these were understandable and relatable to me as a reviewer. However, some articles delved

heavily into the science of linguistics and focused on specific structural elements of language attrition (e.g., pronoun use, masculine and feminine noun confusion, and grammatical structure), which led me to steer away from them. My aim was to look at variables that researchers claimed were related to L1 attrition in children or youth. As such, I chose to focus primarily on articles that discussed the foundational elements (age, exposure, attitudes, school programs, etc.) of L1 attrition rather than the scientific or linguistic specifics that are characterized by language loss.

Recommendations for Future Research

I propose that a key area for further research would be investigating how a child's socioeconomic status (SES) and quality of L1 input received in the home affect L1 attrition. Given the lack of articles available for review on SES as a factor in L1 attrition, further research in this area could help practitioners and researchers see this as an area of focus for understanding language loss and not just language acquisition. Based on what I have read regarding L1 acquisition, retention of L1 grammar abilities or complexity of speech would undoubtedly diminish if children receive lower levels of L1 input at home, both in quality and quantity. This would be of particular interest in studies comparing lower SES children with higher SES children in an expatriate (or third culture) setting, where levels of parental education or financial means were examined. Equally valuable would be studies comparing the same SES factors in immigrant families.

According to Schwab and Lew-Williams (2016), children at the lower end of the SES spectrum tended to receive significantly less high-quantity and high-quality language input at home, affecting their vocabulary development, grammar, and language processing. Researching these two variables further (SES and L1 input) could offer insight into how they can affect one another or correlate at the very least. Schmid et al. (2013) have proposed that students with a

richer experience in L1 will be less likely to experience attrition. Considering this idea of insufficient language input, it is unclear how this also affects lower-SES emerging bilingual students' retention of L1. Nevertheless, based on the research evaluated, my conclusion is that language acquisition and attrition must go hand in hand. If we know that SES plays a significant role in language acquisition, the quality of L1 input at home must also play a role in L1 attrition (or retention) if parents are providing it at a lesser quality or quantity.

Research has shown that children from higher SES homes will receive a higher level of language input than those in lower SES homes—by age 4, 45 million words heard compared to 13 million, respectively (Schwab & Lew-Williams, 2016). Researchers should then consider what this gap can mean for a bilingual child's L2 learning and their retention of L1. If children receive less language in a lower SES home, those who only hear L1 at home risk becoming attriters of that language as they grow in reliance and usage of L2.

Luo (2021) reported that childhood emergent bilinguals—and those in dual language programs—are disproportionately more likely to live in families of low SES backgrounds. This research noted a direct association between a child's SES and L2 learning abilities. Emergent bilinguals from higher SES families showed greater language acquisition and retention skills than those of lower SES families. The research also noted that the gap size did not vary by child age. Home literacy (i.e., access to books, book-reading frequency) and children's existing knowledge (i.e., vocabulary and syntactic knowledge) mediated the SES effect. According to Luo's study, children from higher-SES families (as indicated by primary caregivers' level of education) performed better in learning new language items than those from lower-SES families. Additionally, on average, parents with higher SES were found to provide richer, more diverse,

and more complex language input, ask more questions, and engage in more contingent conversations with children.

The SES gap was observed in both English and Spanish learning processes, showed as early as three years of age, and continued throughout preschool. If a child's home literacy environment and existing knowledge served as two sequential mediators of the SES effect on language learning processes, it would seem that they would similarly affect a student's L1 retention. Bialystok (2018) presented several studies where the literacy skills of low SES native Spanish-speaking elementary-aged students in bilingual (Spanish and English) programs were compared with those in English immersion programs. It is important to note that SES was determined by whether or not the student qualified for the free and reduced-price lunch program. The results showed that students in the bilingual program not only had higher levels of reading proficiency in English but also retained a significant command of Spanish. The students' retention of Spanish was practically significant because it meant they were not losing their L1 but building on it. These elements of prior L1 knowledge and L1 literacy skills are some of the few examples of researchers referencing a variable in the domain of student achievement as a predictor of L1 attrition.

L1 attrition researchers should consider SES a significant factor as it plays into the motivation for L1 development and maintenance. According to Schmid and Köpke (2017)—who have extensively researched L1 attrition—every bilingual should be considered an attriter. However, some researchers consider this statement too broad, stating that L1 attrition must be further evaluated as it is a unique process for L2 learners. Gürel (2017) raises the need for comprehensive studies on the complexity of L1 attrition and how it varies between individuals, and that L1 attrition and L2 acquisition do not necessarily need to go hand in hand. Gürel also

suggests that lead researchers Schmid and Köpke have oversimplified the term L1 attrition and that the very definition is still vague. This alluded to the fact that despite many researchers identifying L2 acquisition as a root cause for L1 attrition, it cannot be assumed that all bilinguals are attriters.

Additionally, after reviewing the findings of this study and relating them to my experiences observing child L1 attrition, I believe further research is needed on how L1 attrition affects children and families who live in third-culture settings—falling into the domain of demographics. What are the implications for families whose children study and attend school in L2, hear and speak L1 at home, yet must maintain enough fluency in L3 to survive in day-to-day settings? This is a unique demographic that hardly surfaced in the literature. Wong Fillmore (2000) wrote about the implications of the loss of family languages which aligned with my thinking. She writes in the context of students in the U.S., but I viewed her assertions to be applicable to those in international, expatriate contexts as well.

Hsieh et al. (2020) presented findings that related to issues within families of Asian cultures whose children lost their native tongue. Families in this study reported their children losing their cultural identity, being unable to communicate with L1-speaking extended family members, and losing cohesiveness between parents and children. Having observed these effects in an international context, I am motivated to learn more about this particular demographic and help educational leaders discover more about how the problem of L1 attrition (research suggests it is, in fact, a problem) involves more than losing proficiency in one language and achieving mastery in another.

Furthermore, researchers could look at language disorder or speech disorder diagnoses and compare them to home language use and loss. Family surveys could be developed to

investigate variables such as a child's age of arrival, length of time in the L2 environment, age of onset of L2 contact, home literacy environment, and literacy skills in L1 (among others) to determine if there are other factors at play apart from what appear to be speech or language disorders (Anderson, 1999).

Recommendations for Future Practice

Practitioners and researchers will benefit from further research on these particular domains, specifically that of student achievement. Since this domain yielded the least amount of variables, it begs the question of why so much emphasis is placed on the acquisition of L2. If we know that strong retention of L1 is linked to a student's overall academic success, there should be a universal system of measurement of a child's L1 skills available for teachers who receive ELL students into their classroom. While a child may appear to be proficient in L2, but shows a lack of understanding of grammatical and syntactic concepts, it would be valuable to have data on the student's abilities in L1. If a student is seen to have undergone severe L1 attrition and is performing poorly in L2 (according to the ELP standards), this could be a way for educators and administrators to target specific interventions that could help the child regain some ability in L1 as a means to unlock further understanding in L2. Practitioners and researchers would benefit from investigating further the phenomenon of L1 attrition as it relates to student achievement.

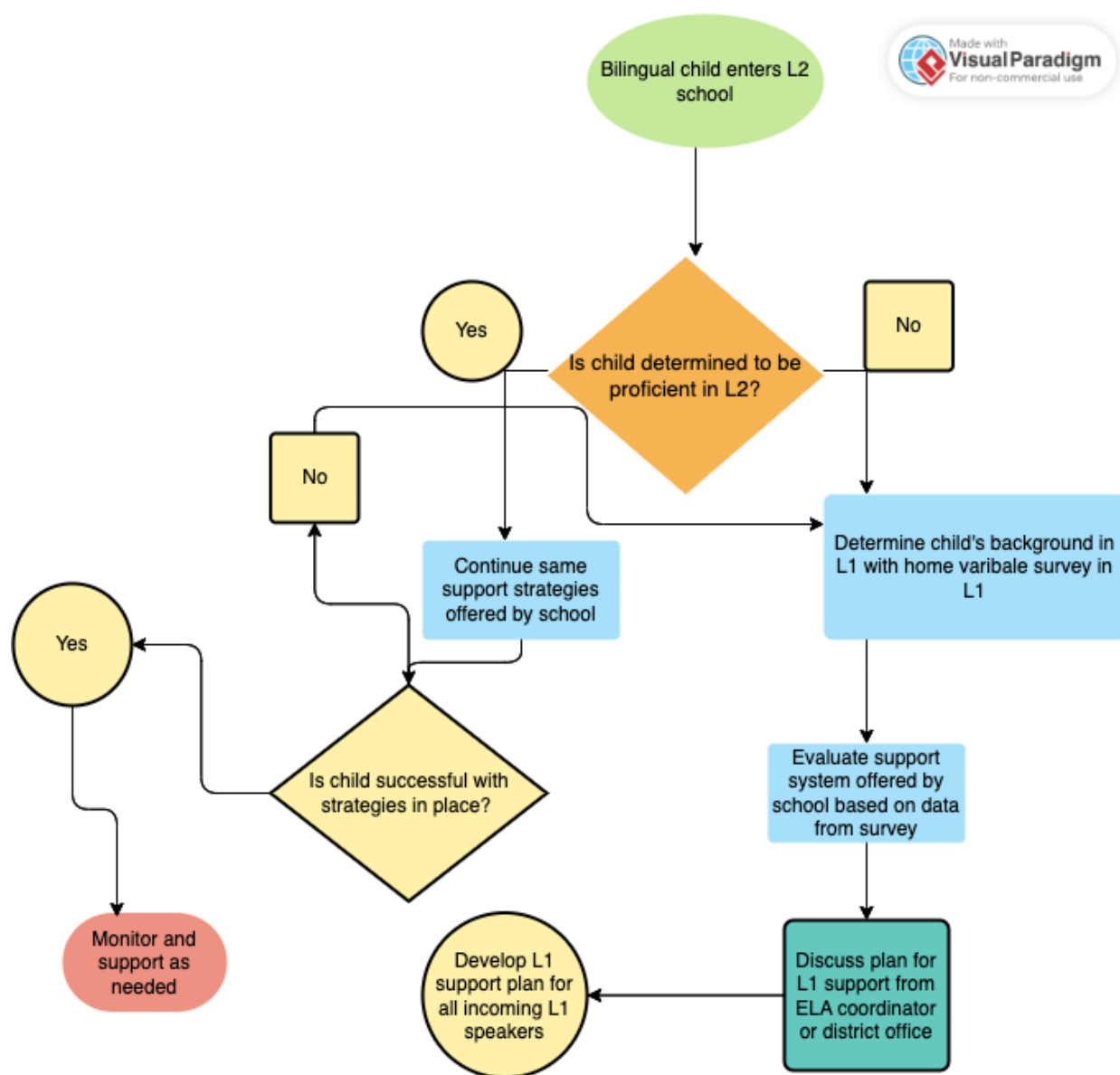
School districts in the United States measure the levels of English language proficiency (ELP) of English language learners (ELLs) bilingual students according to the ELP standards. According to the National Center for Educational Outcomes (2023), each state adopts ELP standards based on the English proficiency domains of reading, writing, listening, and speaking. They must define the levels of proficiency for all ELLs in their schools. While this is extremely valuable for teachers with regard to differentiation, it would be highly beneficial for them to

know more about how well their ELLs not only know their first language but how much of their language experience has been affected by its loss or erosion.

Figure 1 shows a decision chart for how school districts could further consider the way they handle L1 attrition in incoming and current emerging bilingual students by seeking further information about the child's L1 experiences.

Figure 1

Decision chart for practitioners



While this is a preliminary idea, with certain factors to still consider—such as how the school determines the student’s level of L2 proficiency and how a home language variable survey would be constructed—I believe it is a proper first step for practitioners to consider as they consider language loss for their incoming, emerging bilingual students. This type of chart could potentially be useful for teachers and schools at the elementary through high school levels. By following a process similar to Figure 1, practitioners and school leaders could better assess the abilities and assets children have in L1. Even if the school does not have a bilingual track or a full-fledged ELL education department, information gained through a process like the one I have proposed could help teachers and principals view student L1 ability, avoid misunderstandings, and even stave off misdiagnoses related to special education or language disorders (Anderson, 1999).

Concluding Thoughts

The findings of this study highlighted 15 different variables that should be considered critical when conducting research on L1 attrition in children, along with one which was not found (SES). Guardado’s (2002) assertion supported these findings, stating that many variables play into the severity of language attrition in children, such as home life, parental involvement, level of L1 input, degree of importance placed on L1 retention, length of time in one’s resident country, age of arrival into L2 environment, and generational status. Researchers can use this study as a support in future research on L1 attrition in children, examining the 15 important and necessary variables that have surfaced from the literature. Of the four domains, it has been clear that the research highlighted demographics as playing key roles in L1 attrition. Although demographic variables are important to consider, the domains of stakeholder perceptions, school processes, and student achievement—while underrepresented in proportion to their

demographics counterpart—are equally important to factor in when researching L1 attrition. I also conclude that SES should be investigated further as a potentially salient variable in L1 attrition.

I examined a wide range of opinions and theories regarding child L1 attrition related to the four domains as outlined by Bernhardt's (2017) framework. My international education experience now drives me to investigate the third culture element of L1 attrition. I am curious how the different variables factor in not only a child's retention of L1 in an L2 or L3 setting but how attitudes towards retention may vary within families at different socioeconomic levels. Since data on attitudes toward language loss and erosion are gathered through qualitative research, longitudinal studies with intermittent questionnaires for families would help practitioners understand better what students undergo in the L2 environment. This data has the potential to change based on a family's views on the consequences of L1 attrition over time. I resonated with Wong Fillmore's (2000) call to educators, asking them to work together to further develop their methods of helping improve students' retention of L1. A concerted effort from practitioners in this area will not only help make bilingual students' adjustment to school in L2 easier for everyone involved but may also aid in the preservation of their family connections and cultural identity.

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