A MISSED OPPORTUNITY: THE RELATIONSHIP BETWEEN LANGUAGE, COGNITION, AND POVERTY IN EARLY CHILDHOOD AMONG BILINGUAL CHILDREN

by

Saskia Barboza

Liberty University

A Dissertation Presented in Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

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[May 2024]

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ABSTRACT

Human development is a continuous process with critical periods, and early childhood is part of that process, with internal changes prompted by external factors. An essential part of human development is language acquisition and cognitive skills which are shaped by heredity, brain structure, personal differences, social interaction, and socioeconomic background. In recent decades the exposure to multiple languages at home has been growing, causing differences between the language status (bilingual or monolingual) and the executive functions of developing children. Some previous studies have pointed out cognitive differences in bilingual children, while others have not. The present study observed three variables (language, cognitive skills, and poverty), among 500 children between 18 – 36 months, with 250 children identified with a home language other than English and 250 children identified exclusively with English as the home language. The relationship between the variables was observed from DAYC2 scores, a standardized test used to determine eligibility for early intervention services in the categories of no delay, delay, and significant delay. The results can be summarized as a statistically significant relationship of <.001 between language and cognitive skills in all participants and a moderate influence (though not statistically significant) of poverty in language delays. The present study concluded that bilingualism impacts cognitive and language skills and acts as a protective factor that buffers the effect of poverty in early childhood.

Keywords: Language development, cognitive skills, brain development, socioeconomic background, spirituality, bilingualism, and monolingualism.

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CHAPTER 1: INTRODUCTION TO THE STUDY

Introduction

The development of the human being is a core topic in psychology. The observation of development since the time of Plato has enclosed a dichotomy, proposed two concepts, an apparent dichotomy; that is, two seemingly opposing points that, if viewed from another perspective, can be seen as complementary. This dichotomy consists of the concepts of nature and nurture. In its extreme form, it presents heredity, maturation, genetics, and more (nature) accounting for development, not needing to consider environment, experience, and learning (nurture) to account for development. Setting this needless tension aside, both play a significant role in the person's development from birth to death (Lerner, 2018). Human development houses different areas, one of which is language, which profoundly influences the cognitive and social abilities of the individual. *Language acquisition* is a complex process, which is taken for granted as if it were a basic process like breathing or blinking. It is one of the most complicated and complex developmental processes many people realize when they try to learn a foreign language (Bornstein & Lamb, 2011).

A large percentage of the research articles presented emphasize globalization as one of the precursors for bilingualism. In the United States, bilingualism is a recurring experience in the development of children. Thus, it is important to understand the crucial role of exposure to bilingualism in the first years of life, which plays a determining role in the development of children's cognitive and social skills. However, bilingualism itself has a controversy that will be observed through this research study. This controversy is the relationship between the nature and nurture of bilingualism, where the interaction of

physiological elements influenced by the elements of the environment (with a particular interest in the family's economic status) will be observed in children of an early age (under three years).

Background

The present research study is based on the fundamentals of childhood development, understanding that development is a continuous and discontinuous process at the same time, and taking childhood as the basis for learning and the acquisition of many skills that will be perfected later and that will have a crucial effect on adult life such as language development (Lerner, 2018). However, in this language acquisition process, there are exciting elements to observe, mainly related to acquiring two languages in early childhood, which need to be clarified. According to previous literature, there are many cognitive benefits to growing up in bilingual environments. However, at the same time, many children growing up in bilingual environments are referred to early intervention services for being at risk of a delay or already having a significant delay in verbal communication skills. It is presumed that elements of the environment may be interfering in the process, and poverty has been pointed out to some extent. Hence, this research aims to look at the direct influence of socioeconomic status, specifically poverty, on young children's language development and observe a simultaneous interaction in three variables: performance in language skills, cognitive development, and poverty in bilingual early childhood.

It is not new to recognize that there is a close and intimate link between the fragility of an infant and their need for nurturing. Their interaction with the environment and culture will shape them until they can reach levels of maturity and self-sufficiency

(Bornstein & Lamb, 2011). The word childhood comes from the Latin meaning "the one who does not speak" and is a period that extends from birth to two and a half years approximately, where development can be observed in different areas of the individual, including language development and cognitive development, therefore, childhood can be pointed out as the period of development where biology and culture work together (Bornstein & Lamb, 2011). The development of the human being is a core topic in psychology. The observation of development since the time of Plato has enclosed a dichotomy, proposed two concepts, an apparent dichotomy; that is, two seemingly opposing points that, if viewed from another perspective, can be seen as complementary. This dichotomy consists of the concepts of nature and nurture. In its extreme form, it presents heredity, maturation, genetics, and more (nature) accounting for development, not needing to consider environment, experience, and learning (nurture) to account for development. Setting this needless tension aside, both play a significant role in the person's development from birth to death (Lerner, 2018). Human development houses different areas, one of which is language, which profoundly influences the cognitive and social abilities of the individual. *Language acquisition* is a complex process, which is taken for granted as if it were a basic process like breathing or blinking. It is one of the most complicated and complex developmental processes many people realize when they try to learn a foreign language (Bornstein & Lamb, 2011).

A substantial portion of the research articles underscore globalization as a precursor for bilingualism. In the United States, bilingualism is a common experience in children's development. Therefore, it is crucial to comprehend the significant role of early exposure to bilingualism in shaping children's cognitive and social skills. However, the

concept of bilingualism itself is not without controversy, a debate that this research study aims to explore. This controversy revolves around the nature and nurture of bilingualism, where the interplay of physiological elements influenced by environmental factors, with a particular focus on the family's economic status, will be observed in children under the age of three.

Within the physiological part of development in general and mainly of language, it is essential to observe the information derived from research in the psychoneurological field that points out how communication involves acquiring and processing information through the senses and then using language to move and act in the world. According to neuropsychology, each sense has specialized receptors. A receptor is a cell that is structurally prepared to respond to a form of energy, such as sound, and the function of this receptor is to convert this energy into neural responses (Garrett & Hough, 2018). If it applies the bases of the auditorium system to knowledge and behaviors that we all need to learn, we will have, as a result, language. It is necessary to understand that language includes verbal and written communication, which has a predominant value in human relationships since a person who cannot communicate would be at risk of extreme isolation.

According to neuropsychology, the brain has specialized areas in the left temporal lobes as well as the right for language from about the 20th week of gestation, and at birth or shortly after that, speech causes an increase and greater blood flow to the brain than nonverbal stimuli, and the neural processes in people who learn a second language shows brain activations in the frontal lobe depending on whether the bilingual individual learned both languages simultaneously or not (Garrett & Hough, 2018). At the same time, when

the brain is subjected to neuroplasticity, cognitive skills are developing and are fundamental for language development. In the end, cognitive skills are a series of structures and skills that result in both childhood and adulthood attempts to organize experiences completely and coherently (Bornstein & Lamb, 2011).

On the other hand, it is important to note that the development of language and the general development of the individual cannot depend on only a neural or biological base. It is important to note that the individual is submerged and involved in a social environment. According to the bioecological approach of Urie Bronfenbrenner, the individual's environment is divided into five different levels: the microsystem, the mesosystem, the exosystem, the macrosystem, and the chronosystem. The microsystem is the level of immediate and consistent interaction because it is the home, close friends, and caregivers who exert a direct influence by their closeness. This interaction, in one way or another, is active and reciprocal, where the child participates in constructing their environment daily. This level is the one that has a more significant influence on the development of the person. The mesosystem links various aspects of the microsystem; for example, it encourages direct and indirect interactions between parents and children, students and mothers, friends with friends, and others. The exosystem refers to external influences or social institutions such as schools, local government, houses of worship, and more. The exosystem can impact the individual's personal development and subtly influence the abovementioned levels. The macrosystem, on the other hand, represents the influence of culture on the individual, which in turn encompasses society in general with its type of government and its political-religious values that influence education. In some cases, there are also subcultures exerting influences on the person. Finally, the

chronosystem involves each of the previous levels and refers to time, events, and historical changes that, in one way or another, also affect the person's development (Feldman, 2021).

Additionally, it is essential to emphasize that besides physiological, cognitive, and social development, there is the individual's spiritual development. Spirituality is of utmost importance as part of the external influences that function as buffers to adverse experiences at an early age. The scriptures present Jesus, who loves children and presents a perspective of a responsible and loving relationship between parents and children, where respect and obedience lead to good outcomes, and even God's word offers promises.

On the other hand, the Bible faithfully encourages intervention for families in need and poverty and repeatedly proposes the need to help selflessly. Poverty in our current context and even since biblical times has been related to many social causes, of which one of them is immigration, which, after all, would also be one of the causes of children growing up exposed to two languages, the language of the home and the language of society. After observing the elements described above, such as the physiology of language development, as well as the social environment and later the spirituality extracted from the scriptures, it is imperative to include in this research the social and economic background of bilingual children and to investigate the scope that these elements exert on language development, putting them at risk of delay or significant backwardness per se.

Problem Statement

There are extensive studies on language development, and in recent years, there has been a particular interest in bilingualism. Some of the research studies examined the physiological component related to bilingualism (Pliatsikas et al., 2020); other ones center their attention on cognitive skills (Anderson et al., 2018), and some others on the sociocultural elements around bilingual people (Ortega, 2019). In the physiological part, researchers such as Pliatsikas et al. (2020) pointed out that bilingualism affects the brain's structure. The experience changed the grey-and-white matter involved in language learning, processing, and control. Anderson et al. (2018) reported that there are cognitive consequences in bilingualism (Incera & McLennan, 2018), with different variables influencing executive functions (especially switching skills and working memory).

Other scholars focus on the socioeconomic and cultural background related to bilingualism (Yip, 2021, & Ortega, 2019). However, there are also researchers' findings about disadvantages concerning bilingualism, such as Quinteros and Baites (2018), who claim that bilingual children present a smaller vocabulary for each language. Gunnerud et al. (2020) stated that there is no consensus about the specific conditions or population in which the cognitive advantage is effective, and many researchers present inconsistent results about the topic.

After observing the different studies and integrating their findings, a gap prompted a correlational study. The research study included three variables to observe simultaneously:

- cognitive skills (accounted for by switching skills that are necessary to switch between two languages)

- language development (accounted for by receptive and expressive areas)
- low socioeconomic background (poverty)

Observing the relationship between language development and cognitive skills in children exposed to monolingualism and bilingualism and then observing the interaction with poverty brought findings about what type of correlation (positive or negative) there is between them. These findings provided theoretical support to evidence-based practices and may help to predict future correlations in children exposed to bilingualism and poverty at an early age.

For example, the North Carolina Infant Toddler Program was observed, which was reported to have served more than 10,000 children in 2015, and the numbers have been growing. According to the observation of the early Interventionists, language development delay is the most frequent cause of referral in the Latino/Hispanic population (Division of Child and Family of Well-being, 2022; North et al. Foundation, 2022). This information showed that research in language development with an emphasis on bilingualism in early childhood is a priority to understand, prevent, and treat language delays in early childhood, promoting better cognitive and social development of adults later.

The present research study brought the opportunity to support previous findings and provide more evidence about the relationship between language development and bilingualism. The findings of this research study provided important information to support the early detection of potential language development delays and to support new ways to provide intervention that may benefit cognitive and social skills, as well as future school success and improved interpersonal relationships. The problem is a prevailing

need to understand the language development of the child exposed to bilingualism and the factors promoting delays. Due to the close relationship between language and cognitive development, it is essential to create forms to buffer the problem and seek appropriate resources to enhance bilingualism's opportunities. These forms or interventions need to align with the child's social background to promote healthy development and good relationships and predict later success.

Purpose of the Study

The purpose of this quantitative correlational study was to examine the relationship between language and cognitive development in interaction with poverty in developmentally typical children (no established medical conditions) growing up in a bilingual or monolingual context at an early age (18 to 36 months).

Research Question(s) and Hypotheses

Research Questions

RQ1: What is the correlation between language (expressive and receptive) and cognitive skills in children (18-36 months) from bilingual and monolingual family contexts based on the scores of DAYC2 (eligibility tool used in early intervention services)?

RQ 2: What is the correlation between socio-economic status (poverty/non-poverty) and language and cognitive skills in children (18-36 months) from bilingual and monolingual family contexts based on the scores of DAYC2 (eligibility tool used in early intervention services)?

RQ 3: May bilingualism and poverty at an early age predict language delays in children (18-36 months)?

Hypotheses

Hypothesis 1: There is a significant difference between the language and cognitive development of children growing up in a bilingual family background and children growing up in a monolingual family.

Hypothesis 2: There is a positive relationship between lack of poverty and language development in bilingual children and a statistically significant difference between bilingual and monolingual children.

Hypothesis 3: There is a positive relationship between socioeconomic status and language skills; therefore, lack of poverty may predict delays or risk for delays in language development in bilingual children at an early age (18-36 mos).

Assumptions and Limitations of the Study

There are at least four *assumptions* presented in this study. First, as an assumption, it is possible to determine the existence of two dichotomous variables, delay and non-delay status, in language development for the participants. Another dichotomous relationship is the language status, which is pointed out as monolinguistic versus bilingual language skills.

The second assumption to be observed is the character of an ordinal variable because high or low levels of the participants' socioeconomic status can be identified. The third assumption is the use of discrete data identified in the number of participants, which is the exact number of children exposed to bilingualism and the exact number of children from a monolingual background. A fourth assumption is a linear relationship between the variables where, in positive or negative ways, it can be determined if there is (or is not) a statistically significant relationship between the variables.

Four *limitations* were observed during this research study. First, in the sample recruitment process, the present study excludes children not participating in the Early Intervention services. The infant-toddler programs are voluntary and are based on an interactive coaching style, which is a very effective and evidence-based practice. However, a group of families prefer to attend outpatient clinics, or they decide not to participate because they are not concerned about their child's development, which conforms to a non-reachable group in the research process.

Second, the data collection was limited to two instruments, which, although appropriate to provide an effective snapshot of the children's developmental status at the time of the study and validate information about their socioeconomic background, are not easily accessible to people outside the field of early intervention.

Third, poverty and home language are the only two elements from the socioeconomic and cultural background observed. However, the study gathered additional sociocultural information that may be beneficial to understanding the children's immediate context.

The fourth limitation concerns the future replication of the study. To be able to replicate the study, the researchers should have a high level of understanding of management processes. Gaining experience in the field before completing the study is imperative to making easier the understanding of the process and the management of the information.

Theoretical Foundations of the Study

Three crucial theories can be highlighted among the theoretical foundations of this research: the nature versus nurture approach, the cognitive perspective, and the bioecological approach. Additionally, the spiritual perspective is important, and it was based on three main topics: childhood in the scriptures, what the Bible says about poverty, and the issue of immigration in the scriptures (along with the cases it presents on this topic).

The first theoretical foundation is based on the controversy about nature and nurture, which, although it has been present since ancient times, has been taken up by various scholars. Bornstein and Lamb (2011) explained this controversy based on the observations of Anastasi (1958), who stated that the initial way to approach the issue is by asking the question, "What is it?" is nature or is nurture, referring to the fact that human development must be understood from one of these extremes, from the extreme that points out the importance of biology and genetics, or from the end of nurture that points directly to the environment and its influences. However, Anastasi claims that this question is incorrect. According to how Bornstein and Lamb (2011) approach the problem from the perspective of Anastasi (1958), there is an intrinsic link between heredity and environment to the point where they cannot exist independently. However, other questions are inappropriate to the subject, such as the question of "how much?" and how much of each (nature and nurture) is involved in development. Since both are completely involved, the correct question, according to Anastasi (1956), cited by Bornstein and Lamb (2011), is, "How?", how do nature and nurture interact dynamically to produce behavioral development?". This perspective rejects the concept of separation,

of breaking between nature and nurture, since it is observed that the part of nature affects behavior in a direct way, which in turn acts in a context in an environment with a diversity of factors (Bornstein & Lamb, 2011).

The second theory that is part of the foundation of this research is the cognitive perspective, which focuses on the processes that allow the individual to know, understand, and think about the world around him, emphasizing the processing of information and the understanding that exerts an effect on the individual's behavior (Feldman, 2022). Among the most outstanding theories of the cognitive perspective is Piaget, who proposes a series of universal and sequential stages of development where knowledge accumulates at each stage and improves in quality. According to Piaget, cognitive skills such as thinking are organized into schemes that produce behaviors and actions, which are initially basic and straightforward, such as sucking during feeding or reaching for things around them during childhood, and then become more complex and abstract in adolescence, language development is a cognitive skill observed by Piaget. (Feldman, 2022).

The third fundamental theory in this research is the bioecological one, presented by Urie Bronfenbrenner, who suggests that the individual is influenced by the environment, which is divided into five different levels. At the center of this approach is the individual, who in the context of this research would be an early child who relates to the microsystem, which includes his close family and people with whom he can have a relationship daily as friends, teachers, or playmates, and the next level is the mesosystem which is the level that provides the bonds of interaction and connection between various linked people, such as parents and children, teachers and students, friends with friends,

and more. Then there is the exosystem, the most distant or broad level of connections, such as government agencies and religious or political value systems. In general, children are seen as part of a broad culture. Finally, there is the cronosystem, which subtly interacts with all previous systems and is related to time and historical events that influence development in one way or another.

The fourth foundational theory, more than a theory, is a biblical perspective from which three elements were rescued: the perspective of how the scriptures observe childhood and the importance of children in the kingdom of God, the second element is related to the perspective of poverty according to the Bible, and finally, there is a subtopic that is closely related to poverty and bilingualism, immigration. Immigration status can be for a person, a family, or an entire town, where one of the biggest and most frequent challenges to face are language barriers and cultural differences. The Bible story itself shows immigration as a fundamental element from Abram, Jacob, Moses, and the Jewish people themselves. Scripture frequently incites God's people to give special attention to the poor, immigrants, refugees, and strangers by offering protection and respect.

Definition of Terms

The following is a list of definitions of terms that were used in this study.

Bilingualism is the ability to perform verbally and efficiently in two languages. (Feldman, 2021).

Child development – is the area of study about the growth of the individual in a gradual and orderly way by stages from birth to adolescence and the changes that entail (Feldman, 2021).

Cognitive development – is the area of development that observes and studies the processes through which the individual can know, think, and understand the universe in his environment (Feldman, 2021).

Developmental Assessment of Young Children 2nd edition (DAYC2) - Test used to identify children between birth and five years with possible delays in five domains. (Pearson Assessments)

Early childhood – In the child development area of study, early childhood refers to the age from birth to approximately 8 years. (Copple & Bredekamp, 2009).

Early intervention – Coordination and provision of needed services during early childhood (Mowder et al., 2009).

Evidence-based practices (EBP)- Integrating the best available research and clinical knowledge with clinical expertise in the context of patient's individual characteristics, culture, and preferences (Mowder et al., 2009).

Infant – Children from birth to 1 year old (Feldman, 2021)

Language development – is the process of language acquisition and communication that combines six elements: 1- the receptive area, known as auditory development, 2- the development of articulation or speech itself, 3- word learning or lexical development, 4- the system of rules that govern the language that is known as grammar, 5- the pragmatic development that refers to the ability to communicate socially, and 6- literature and its development. Each element requires a unique set of rules and methods that produce milestones that mark the language's acquisition parameters and normal development according to age (Bornstein & Lamb, 2011).

MyAvatar – Certifies electronic records program designed to be used by organizations that provide behavioral health services (MyAvatar)

Nature – It refers to the perspective that favors innate biological influences such as those that propose the individual differences of the person in his development (Bornstein & Lamb, 2011).

North Carolina Infant Toddler Program (NC ITP). This is an Early Intervention Section (NCEI) that is a part of NCDHHS' Division of Child and Family Well-Being, which provides support and services for families and their children, birth to three who have special needs (www.ncdhhs.gov/itp-be early)

Nurture refers to the perspective of the environmental experience as the fundamental role in the individual development of each person (Bornstein & Lamb, 2011).

Poverty – The most common definition of poverty is the one that is linked to the lack of primary resources to survive or to stay at the minimum level according to social standards; however, when talking about poverty, it is important to understand that poverty is relative concerning to quantities and expectations, poverty occurs in all countries of the world and races, and generational and situational poverty is different, the latter being temporary. (Payne et al., 2001)

Preexistent medical condition– Formally assessed and identified disabilities (Mowder et al., 2009).

Toddler– Children between 16-36 months approximately (Copple& Bredekamp, 2009).

Significance of the Study

It is possible to point out three areas in which this research provided significant results. First, the results provided important information about language acquisition in

children growing up in bilingual backgrounds from a contemporary perspective, including concepts of neuroplasticity and the interaction of executive functions at an early age. As was explained above, early childhood is a window of opportunity to promote the best outcomes of brain development, as it is a critical period for development, Feldman (2021). This research offered relevant results in cognitive and language development in early childhood, contrasting with monolingual children. Early intervention services will benefit from this information to understand, prevent, and treat children at risk or already delayed in their language development. Psycholinguists have been researching this topic for many years. However, the increase in bilingualism has forced interest in this topic to grow and seek findings to understand better the neurological, cognitive, and social development of the new generations in our immediate context and worldwide (Yip, 2021).

Early research on early childhood language development pointed to bilingualism as an advantage for developing cognitive skills (Gunnerud, 2020). However, early intervention services observe many children with bilingual backgrounds presenting delays in language development. Therefore, this research included observing socioeconomic elements, specifically poverty, as possible variables affecting or diminishing the advantage of bilingualism. This research provided results of the interaction between the areas of language, cognitive skills, and socioeconomic level that helps identify these factors as determinants or significant in the language acquisition process in young children. In other words, it is imperative to understand the pragmatic side offered by this research, being able to observe in an intertwined way three variables in the same study, which have been studied disintegrated. Also, conducting this research

with a sample of young children at the critical moment of language development offers the opportunity to provide conclusions that predict the course of the child's development and prevent possible language delays and communication skills. Because early intervention services are evidence-based, providing statistically significant findings will equip them with tools to deliver services that meet state-required safeguards and develop appropriate outcomes to treat developmental delays. Another pragmatic element of this research is to point out that the fact of being able to investigate a bilingual sample and a monolingual sample provides important information to make therapeutic decisions that will directly affect them, understanding that the population of children exposed to two languages has grown considerably in recent decades in the United States and throughout the world.

Lastly, this research has yielded results that bear weight on the spiritual development of young children. These findings should be of utmost importance to God's people, as they provide a deeper understanding of the significant role, they play in reaching and assisting in the development of early childhood. Recognizing the crucial role early childhood plays in shaping adulthood, this research also offers pertinent information on the vital role of God's people in reaching and helping individuals and families in need, transcending any communication barriers, and demonstrating acceptance and respect to people who are foreigners in our country.

Summary

The present chapter's outcome was to introduce the topic of interest and present the fundamental theories and basic concepts on which this research will be based.

Understanding the general basis of this research and observing the purpose and fundamental terms will help develop a general idea of the following chapters, starting with a contemporary literature review of the topic.

The present study's findings explored the impact of bilingualism on language acquisition, executive cognitive functions, and interaction with sociocultural elements such as poverty. The findings of this research study should be beneficial in the early detection of developmental delays and support early intervention services. The information from this research study provided an opportunity for any agency, program, or individual to support bilingual families with infants or toddlers in developing their language and cognitive skills, regardless of their socioeconomic status.

CHAPTER 2: LITERATURE REVIEW

Overview

This chapter aims to summarize results arising from recent research on early childhood development in at least three areas: language, cognitive skills, and interaction with social elements.

The research articles presented below cover various subtopics, including dichotomous but complementary elements that point out physical elements such as brain development, in addition, cognitive elements such as executive functions such as switching skills, and finally, the influence and integration of social elements such as low socioeconomic level and linguistic status.

The primary aim of this literature review is to establish a theoretical foundation for understanding the language development of young children, particularly those influenced by early exposure to bilingualism and other social factors like poverty. This knowledge is not only academically enriching but also has practical implications. It can aid in the early detection of language problems and the development of effective prevention mechanisms, thereby significantly improving the future prospects of these individuals.

Description of Search Strategy

The search for the theoretical framework that supports the development of this research study was carried out through research articles in a large percentage from the last five years obtained from the Jerry Falwell electronic library of Liberty University and the electronic library of the Atrium Health Wake Forest Baptist. The search terms used are language development, brain development, early childhood, bilingualism,

monolingualism, poverty, socio-economic status, and spirituality. The biblical research was based on a few articles about spirituality, studying scripture with discernment, and applying critical thinking.

Review of Literature

According to Fiske and Taylor (2018), language development is more than speech; it includes the creation of written, spoken, and gestural communication and has a vital role in human relationships. The evidence indicates that when a child is exposed to language from birth, there is a universal ability to perceive phonemes in any language. However, around the age of six months, the ability to discriminate and contrast native and non-native phonemes begins to disappear. Around nine months of age, vocalizations and babbling approach the phonetics of the native language. By 12 months, the phonetic ability is tuned to acquire the language to which it was exposed and acquire the native accent (Berken et al., 2017).

Brain Structures

Fiske and Taylor (2018) have pointed out that a person unable to communicate his or her thoughts may suffer in isolation and cannot understand others. These skills depend not only on learning but also on brain structures. According to this literature, language development has a physical, personal, and social component, and communication is vital in the interaction of the individual with the environment, which is observed at different levels by Urie Bronfenbrenner and his bioecological approach (Feldman, 2022). Tudge et al. (2021) have pointed out how this approach conceptualizes the proximal processes that include the everyday activities and interactions between individuals and their environment. The proximal processes are defined by Bronfenbrenner himself as "the

engines of development" and are considered positive in two ways: increasing competitiveness and buffering dysfunctionality. From this point of view, development results from interaction with environmental and biological factors, which cannot be observed independently (Merçon-Vargas et al., 2020).

Proximal Processes

Urie Bronfenbrenner has explained that development throughout life, mainly at an early age, occurs through progressive processes of a complex interaction between a person and other people, objects, and symbols of their immediate context or environment. The interaction must occur regularly over a period, and its effectiveness is based on the fact that these processes are not unidirectional but that they influence each other (person-environment), known as proximal processes (Merçon-Vargas et al., 2020). According to Bronfenbrenner, cited by Merçon-Vargas et al. (2020), the form, power, content, and direction of proximal processes change systematically and reciprocally. In summary, the ecology of human development, according to Bronfenbrenner, is the progressive study and mutual accommodations that occur throughout life between individuals and their environment, starting with the closest relationships and settings and then extending to the most distant informal social contexts. There are four proximal processes influencing development:

1. Genetic transmission
2. The effect of physiological and psychological changes during early childhood
3. Relationships, attitudes, and interpersonal interactions between the child and the family
4. The impact of the immediate physical environment

The child's characteristics intrinsically influence the first two, but the other two focus on what surrounds the child (Merçon-Vargas et al., 2020). In summary, Bronfenbrenner has stated that human development, mainly in the first years of life, occurs through interaction between the person and people, objects, and external symbols. These interactions are reciprocal, must be of good quality, and for considerable periods, and these relationships are part of the context surrounding the person, within which is the immediate context (child-parents-school) and the more remote context such as religious culture and social circumstances (Feriver et al., 2020). It is important to note that human development involves three elements: physical development, social and personality development, and cognitive development, which emphasizes intellectual skills, learning, memory, problem-solving, and language development (Feldman, 2020). The latter (language development) is one of the central points around which this dissertation revolves.

Nature versus Nurture

According to Lerner's perspective (2018), the history of human development presents a controversy between the concepts of nurture and nature, which can be represented by the movement of a pendulum in a clock, from one side to the other, from the side of nature to the side of nurture. McMurray (2016) has explained that this controversy applies to language development, where language can be seen as part of the biological endowment received or acquired through complex experiences.

In one way or another, researchers point to sophisticated language as a unique feature of human communication. Furthermore, McMurray (2016) has explained that one of the most assertive ways to respond to the nature and nurture controversy can be

observed directly from twin research as it provides a clear delineation of genetic variability and environmental influence. McMurray (2016) indicates that the fundamental problem lies in assuming that there is a unique genetic contribution to language, but this is different from the way genes work. Genes contain information to create proteins that, in turn, help in the creation of cells. In other words, genes do not act alone; they respond to the cellular environment and are shaped by brain activity, which is the end-product of the environment surrounding it.

In summary, it is essential to understand that there is no single path between genetics and language, and neither is there a single unique learning experience about language. There is a complex path between the two, a bidirectional exchange or interaction system between genes, proteins, cells, brain structures, behavior, and the environment. In short, there is no genetic code for language development, only one for proteins. Hence, between genes and high language levels, there are numerous analyses and various forms and paths of development, which should include culture, learning, prenatal environment, and epigenetic factors: "Genes do not 'cause' development; they contain rich information that development can use" (McMurray, 2016, p. 1095).

Language Development

Language is a system of symbols and basic meanings used for communication; it allows humans to reflect their thoughts to other people. It has specific vital characteristics that are essential to develop, which are phonology (sounds), morphology (rules), and semantics (meaning). From the prelinguistic stage, several interactions between the child and the adult help the child develop the understanding and production of sounds, gestures, cries, murmurs, and others, which are the first forms of human communication

(Felman, 2020). Two components, observed across cultures, are involved in the development of language competency among children: the receptive and the expressive skills. These skills include knowledge and word order, grammar rules, and conceptual knowledge. These components are essential in predicting people's future reading skills (Yang et al., 2022).

Receptive Skills

Preschool years are considered critical periods of development (Feldman, 2022). During this time, vocabulary acquisition helps to develop language, literacy, and communication (Yang et al., 2021). According to Yang et al. (2021), a correlation exists between receptive language and school readiness, where poor receptive language is likely to relate to low school readiness and higher risk for successive academic challenges. On the other hand, high-quality preschool experiences are concurrently and longitudinally related to learning and cognitive development. In one way or another, Yang et al. (2021) pointed out that interaction with adults (parents and teachers) becomes a fundamental source of language acquisition at an early age.

Expressive Skills

Yang et al. (2021) also point to preschool years as a preponderant time to learn and develop vocabulary efficiently before participating in formal teaching, which exerts a significant influence in the later years. For example, they point to a possible difference of up to 600 words between 3-year-olds from different family backgrounds, which is maintained through later years. The child’s vocabulary can be observed through word comprehension, receptive language, and expressive language.

Language Status: Bilingualism or Monolingualism

Globalization has openly promoted interaction between people from different places, facilitating bilingualism (Yip, 2021). Xiaoxue (2021) explained that the ability to learn and use language is specific to humans and is part of every person's biology. There is a "native" language that, with a healthy brain and the correct input, will grow naturally and effortlessly, following similar trajectories in other areas of development. The previous explanation is what can be called monolingualism, but what is bilingualism? According to Nguyen and Winsler (2021), bilingualism entails the proficiency and regular use of at least two languages. They continue explaining that other variables are involved in bilingualism, such as the age of acquisition, balance (between receptive and expressive areas), culture, and context. The term bilingualism was observed from a one-dimensional point of view. However, from this perspective, bilingualism loses the opportunity to observe the variability of the integrated populations (Francot et al., 2020). According to them, there is an excellent variety in the degree of proficiency in the use of the two languages, so different terms such as "unbalanced bilinguals" or "semi-lingual" have been used to do justice to the level of each on the other hand, there are other researchers that have pointed to bilingualism as a continuum, not as two separate elements. However, it is crucial to recognize that, in one way or another, there are elements that profoundly influence the frequency with which languages are used and the mastery of language. Going much further, it is necessary to include receptive and expressive skills, age and in what order each language was acquired, the structural differences and similarities in each language, even the socio-economic status of the person and his family (Francot et al., 2020), and timing. The latter suggests that the time in which the second language is acquired is critical, as it can predict the interactive role

that the child's internal factors and surrounding environment play in the acquisition of the first language (Makrodimitris & Schulz, 2021). According to this last statement, acquiring a second language at an early age (before four years) is subject to the effects of critical periods of development. However, the acquisition of a late language (after four years) not only depends on critical periods but also on the amount contributed of the second language and will language acquisition be possible if exposure does not exceed approximately 25% of the overall language input, that is, just vaguely listening to conversations does not guarantee the learning of a second language (Hoff, 2006). It is necessary to point out that there will also be significant changes depending on the bilingual child's profile, whether simultaneous or sequential (Makrodimitris & Schulz, 2021).

Bilingual Profiles

How bilingualism manifests itself in each person can change according to the context and can be susceptible to linguistic and non-linguistic influences such as age, transitions within the educational or social settings, and the development of cognitive skills affecting both proficiency and language use (Francot et al., 2020). According to them, among the non-linguistic influences related to the level of proficiency found through research are the socio-economic level of the family and the level of education of the mother. It has been found that the degree of a mother's education affects one language more than the other, as well as the place where formal education was completed and in which language (Francot et al., 2020). Bronfenbrenner also stated that the effect of context on the person is interactive, and a specific example is the influence of the mother's educational background on the child. (Merçon-Vargas et al., 2020).

Other researchers considered other profiles. For example, Nguyen and Winsler (2021) explained that a bilingual person may learn both languages *simultaneously* from birth and *sequentially* when the learning of the second language comes after the first language is developed. Ortega (2020) extended the concept of sequential bilinguals, dividing the concept into early sequential and late sequential, according to the combination of the age at which most of the language was learned and the chronological sequence. Early sequential children experience an initial period of monolingualism, but then soon, the new language is introduced when the child is still in a naïve stage to formal literature. Sequential late childhood develops when the period of monolingualism ends and when it is introduced to formal literature, mainly by the introduction of the school system.

Javan and Ghonsooly (2018) also propose other classifications within bilingualism, such as primary bilingualism and secondary bilingualism, which are related to the learning context. *Primary bilingualism* occurs when a child acquires his language without direct instruction but rather is taught through interaction with people around him who speak the language. On the other hand, *secondary bilingualism* refers to acquiring a second language through formal teaching in a classroom where the new language is learned and practiced. According to Javan and Ghonsooly (2018), these two classifications of bilingualism are also known as natural instead of primary and school instead of secondary.

There are two other bilingualism classifications, as Gullifer and Titone (2020) pointed out. According to them, linguistic diversity can vary according to the context or individuals so that it can be found in specific bilingual populations, people speaking

languages without mixing them in a *compartmentalized* context, or on the other hand, it can be found in an *integrated* form where languages are mixed without taking into consideration the context of communication. In addition, according to psycholinguistics and neurocognitive perspectives, there is a context of interaction determined by the individual differences in how each person accesses, represents, and controls each language. In other words, language use and well-marked executive function skills can be predicted among those who use compartmentalized language compared to those who use it integrated (Gullifer & Titone, 2020). Gullifer and Titone (2020) indicate that language variability has theoretical implications for brain behaviors, structure, and function.

Bilingual Advantage

The leading theory related to bilingual advantage explains that learning two or more languages affects the brain by strengthening the individual performance of cognitive functions such as inhibition, attention, working memory, and switching (Gunnerud et al., 2020). Javan and Ghonsooly (2018) state that bilingual children perform better than monolingual children in identifying incorrect grammatical sentences. Therefore, the results indicated superiority regardless of activity level. This advantage is known as the advantage of bilingualism, where there is a large amount of information pointing to bilingualism as an agent of potentiation of the skills of executive functions of the brain mainly at an early age because the child confronts the two languages daily where he must deal with two different languages both the part of the understanding and the response according to each language. Javan and Ghonsooly (2018) mention that among the executive function skills influenced by bilingualism are the skills of attention

control, switching skills, and working memory, and Secer (2021) even stated that bilinguals tend to perform better than monolinguals use these three executive functions. Incera and McLennan (2018), in addition, attribute the advantage of the bilingual to the interaction and management that must be had between the magnitude of the demands to which the bilingual is subjected and the magnitude of experience to which he faces handling both languages, in other words to the number of opportunities he must use both languages and as Gunnerud et al. (2020) stated, an affluent bilingual always keep the two languages activated and interacting even though he is in a situation where the use of only one language is required.

In general, according to the findings derived from the research results, there is a relationship between bilingualism and brain development from childhood, and even as Javan and Ghonsooly (2018) point out, even in adulthood shows benefits of decreasing aging and slower deterioration of executive function skills in middle age and old age. However, other studies also point out disadvantages, such as Quiterios and Bates (2018), who stated that bilinguals may have a smaller vocabulary size and slower lexical retrieval for each language, or Tran et al. (2019), pointing out that bilingual advantage is the result of the influence of culture and daily experiences where people who are learning more than one language must make fast and adaptive changes from one situation to the other situation. Moreover, Secer (2021) mentions that there are investigations where the bilingualism advantage is not observed significantly, possibly due to bias in publications or primarily due to the absence of control of confounding variables such as socioeconomic status, ethnicity, or linguistic factors among groups.

Literacy is another area in which advantages and disadvantages are identified concerning bilingualism (Barak et al., 2022). Two areas can be observed: learning new words and retrieving or selecting lexicons, which are fundamental in literature. Barak et al. (2022) point out that simultaneous and sequential bilinguals tend to present lower scores than monolinguals regarding lexical retrieval. However, in relation to learning new words, bilingualism has been found to be an evident benefit.

Bilingualism and Brain Development

When talking about language acquisition and, specifically, bilingualism at an early age, it is necessary to point out the optimal periods of development that, from the beginning to the end, respond to a pre-programmed molecular influence and sensory experiences. Language acquisition occurs in a time like an open window in development where the brain can efficiently organize the learning of two languages (Berken et al., 2017). At the microscopic level, bilingualism can be represented as a cascade of biochemical events that increase cell production and promote macrostructural changes in the brain and strong connections (Berken et al., 2017).

Goksan et al. (2021) explained that the relationship between language acquisition and brain development can be easily observed during early life experiences and much more through early bilingualism exposure. Neuroplasticity, in other words, the adaptability of the brain that is acquired and with which it is formed through life, is the concept that best explains the impact of bilingualism on the brain because the activation of two languages exerts a greater cognitive demand that influences at the brain including nonverbal processing (Gunnerud et al., 2020). There is neurological evidence in the relationship between bilingualism and the age of language acquisition (Incera &

McLennan, 2018; Ji et al., 2004). For example, after applying functional magnetic resonance imaging (fMRI), it was found on the cortex that when the second language is acquired in adulthood, it is separated from the native language, but when the second language is learned during childhood, both (second and native language) shared common frontal cortical areas.

There is a growing body of research showing that there are alterations in the structure of cortical, subcortical, gray matter, and white matter areas of the brain of bilinguals through the acquisition and maintenance of new skills, including the learning of a second language (Pliatsikas et al., 2020). According to them, bilingualism requires education, knowledge, and language-related skills such as phonology, grammar, and semantics, and it is necessary to include and observe the issue of age and experience (Platsikas et al., 2020).

For example, it is explained that experienced bilinguals with an intense immersion in environments where they substantially develop bilingualism show significant differences in white matter compared to bilingual youth with limited experiences and monolinguals who show little or practically no changes in white matter. The relationship between bilingualism, age, and brain development needs much more research. However, there are two neural mechanisms related to this: one is myelinization, and the other is pruning; it can be pointed out that less pruning (less gray matter tissue loss) occurs during the brain development of a bilingual, and in addition, an increase in myelin promoting more efficient neural communication.

The exploration of the bilingualism-brain development nexus is facilitated by a range of methods, including functional and structural magnetic resonance imaging (fMRI

& MRI), diffusion tensor imaging (DTI), electroencephalography (EEG), Event-Related Potentials (ERPs), functional near-infrared spectroscopy (fNIRS), and magnetoencephalography (MEG). Each method, with its unique strengths and weaknesses, contributes to our understanding of how the brain processes language (Luk et al., 2020).

It should be noted that only MRI and DTI allow observation of the brain's structure, including gray and white matter, about language development. Among the research results, at an early age, infants show connectivity between bilateral temporal regions when responding to language. However, the adult shows more interhemispheric connectivity of the temporal and frontal regions of the left hemisphere, which shows that newborns have a biological predisposition to respond to language where white matter supports the language development that matures over time (Luk et al., 2020). The researchers pointed out that using two languages consistently allows them to use neuroimaging techniques to investigate brain functions and structure associated with everyday experiences and contrast it with monolinguals (Luk et al., 2020).

As previously mentioned, the research literature states that there is a relationship between language development and brain development. It also points out the relationship between neural networks and cognitive abilities. As the brain network develops, it proceeds in a segregated way, strengthening local connections first before initiating a process of integration. Therefore, cognitive development and brain development are parallel at an early age, giving way later to specialization and integration (Woodburn et al., 2021). In summary, Woodburn et al. (2021) have proposed the existence of a pattern of increased specialization followed later by integration between cognitive skills and

brain development, although with differences in time. For example, the sensorimotor system develops in the first year of life, while the development of executive functions extends into later years of childhood and even adolescence.

Bilingualism and Executive Function Skills

Cognitive skills, mainly executive functions such as inhibition, monitoring, and switching, have a close relationship with the effective performance of daily activities, and these everyday experiences, stimulation of the environment, and cognitive training benefit inactive cognitive potential (Secer, 2021). Understanding this, Secer (2021) pointed out that because bilingualism requires the coordination of two languages through inhibition and switching skills, it can be considered an effective form of cognitive training to improve executive functions.

According to Quinteros and Bates (2018), the current literature review regarding bilingualism pointed out that bilingualism is linked to higher executive control skills. Executive control was described by Hartanto et al. (2019) as a group of processes such as inhibition, shifting, and working memory, which are essential in many aspects of childhood development, such as school readiness, academic achievements, socio-emotional competencies, and healthy physical development, in other words, the executive function plays a crucial role in child development. It is important to note that executive functions act in two ways: on the one hand, in unity, where there is an interaction between subcomponents or subfunctions that cannot be disassociated, but on the other hand, it also acts diversified, where executive functions can act showing some independence. (Gunnerud et al., 2020)

Based on research results, Javan and Ghonsooly (2018) point out that there is a bidirectional relationship between bilingualism and executive function skills. The relationship is because bilingualism improves skills by promoting and predicting better performance in future learning while at the same time improving executive function skills that help language learning more effectively. According to Arredondo et al. (2017), bilingualism influences shifting skills and attention which are necessary to focus and shift attention by ignoring distractions; these skills are also called "selective attention" (Grundy & Timmer, 2016). In other words, bilinguals must continuously select the correct language to respond to the person speaking to them and monitor their environment to avoid conflicts in the information received and offered (Gunnerud et al., 2020).

Thus, for the bilingual, sustained processes operating on perceptual and long-term memory enhance the accessibility of information across the lifespan. Furthermore, the findings of Gunnerud et al. (2020) have shown that bilingual children use more mature strategies of attentional control than monolinguals due to the infant's need to make associations between the words that he/she is using and processing in one of the two languages that he or she is learning.

Cockcroft et al. (2017) have explained that because lexical items are connected to concepts and are activated in both languages, the bilingual person should select the language in use and inhibit the language that is not in use; in other words, the person needs to monitor which language is appropriate in that specific communication/situation as they continue to learn in both languages and strengthen the executive control. Javan and Ghonsooly (2018) stated that the effect of language acquisition on executive function

skills has a phonological and cognitive correlation observed through neuroimaging and behavioral responses where the bilingual activates the two languages simultaneously during communication and uses their skills to execute control over them.

It is essential to understand that executive functions are developed during childhood and pre-school years. First, inhibition and working memory are developed, and then switching skills, which are the most complex to develop, extend into adolescence. To use switching skills, the person must first inhibit the first language and then save the other language in working memory. Switching skills require the person to adapt to each new situation using careful processes, ultimately developing switching skills (Boerma et al., 2022).

Code-switching

Code-switching is a practice widespread in bilingual people (Kaushanskaya & Crespo, 2019) is disengagement from one language and engagement in the other language rapidly, a behavioral response to adapt to the ever-changing environment (Blanco-Elorrieta et al., 2018). During code-switching, introducing a new language executes changes in the architecture of cognitive, lexical, and internal processes, enabling the person to mix the languages when speaking. Code-switching is not a sign of laziness but behavioral changes, which are common in bilingual communities (Yip, 2021). Research related to code-switching shows mixed results. While some research indicates a positive correlation between receptive and expressive vocabulary skills, other research indicates a reduction in these skills in children exposed by their parents to code-switching regularly (Kaushanskaya & Crespo, 2019).

To find a point of reconciliation between these research results, Kaushanskaya and Crespo (2019) have proposed the observation of individual differences as being responsible for the impact of exposure to code-switching. In line with this proposal, the cognitive abilities of bilinguals have been observed through neuroimaging, such as in the singular and dorsolateral prefrontal cortex (Blanco-Elorrieta, 2018), thus highlighting individual differences.

Code-mixing

Code-mixing is strongly present among bilinguals from childhood to adulthood and refers to using language elements from two different languages in the same portion of a conversation. It can occur within the same word (intra-utterance) or between several words (inter-utterances). The frequency in which a child uses intra or inter-utterances will depend on the form, the nature (function or content), the degree of proficiency, and the context (for example, between bilinguals or monolinguals). It is also worth pointing out that individual differences can be observed openly between people of the same family (Hoff & Shatz, 2007). There are several ways of seeing code-mixing. Positively viewed, it can be observed as a sophisticated, helpful skill with specific rules. In contrast to this view, code-mixing can be interpreted as a sign of incompetence and confusion.

Lastly, code-mixing has functional and grammatical properties; in particular, it is gap-filling because while the child is learning to use the language, they need to mix words of the language “A” with words that they do not know clearly in language “B”; among bilingual children, the language that tends to mix the most is the one with the lowest domain (Hoff & Shatz, 2007).

In summary, Ezhe et al. (2022) state that there is a difference between code-switching and code-mixing. However, both are effective strategies and skills that support those learning two languages. Code-switching is the juxtaposition of two languages in a dialog where it is transferred from one code to another to communicate. At the same time, code-mixing can use two or more codes in a single utterance. (Ezhe et al., 2022), both are active in bilingualism, which is defined by Anderson et al. (2018) as a multifaceted experience influenced by social and individual factors in the form of a continuum, defined by proficiency levels, degrees of exposure and use of language, age at which the person acquires their second language and formal education.

Social and Cultural Connection with Bilingualism

Bilingualism offers benefits beyond cognitive functions. According to Gunnerud et al. (2020), research indicates that bilingualism supports the person in strengthening ties with their family and culture. It is also related to long-term success, opens possibilities to obtain better jobs in a globalized world, facilitates more significant participation in society, and allows access to information and more understanding of other cultures. As discussed previously, language acquisition and status have different components, including the socio-cultural area. Regarding the social-cultural site, Garcia et al. (2018) pointed out that there is a visible increment of minority children (such as Latino/Hispanic) in the U.S. population.

According to Thomas-Sunneson et al. (2018), Hispanics currently account for around 25% of school-aged children, and in some states, such as California, it is around 50%. Most of these children live in families with Spanish as a home language and schooling in English. These facts are crucial to research and for a better understanding of

the acquisition process in bilingual children. The cultural effects of bilingualism are vast, and many factors influence the acquisition of at least two languages, and the experience may vary significantly between populations (Quinteros & Bates, 2017).

Trevino and Garstein (2022) affirmed that children who learn two languages simultaneously develop in a uniquely multicultural environment, where culture, social class, and minority status play a critical role in development. Within Latino families, Trevino and Garstein (2022) have explained that several specific characteristics must be observed, such as parenting practices, the degree of stress in parents, socioeconomic status, and the impact of immigrant status on development. These characteristics are important because the children's social learning, cultural identity, and access to resources depend on them.

Heritage Language and Family Policy

Ortega (2020) presents an exciting statement about bilingualism as a norm (applicable also to multilingualism), referring to all those children who grow up between two languages, the inherited language spoken at home, different from the language spoken in society. Inheritance language is an ethnic experience that effectively makes the development from child to adult occur in both languages and settings. Ortega (2020) presented a question about the specific time determining which heritage language is used. At the same time, Ortega (2020) stated that, according to research, there are two different approaches. One says that the inherited language is the one that is presented or determined during the first five years of life. The other approach says that participants can be up to 15. Makrodimitris and Schulz (2021) have stated that the amount of inherited language spoken at home positively affects the performance of receptive and

expressive vocabulary. However, according to Ortega (2020), it has also been observed that people with heritage language often do not develop at the same grammatical level as native speakers.

There are at least three essential components to consider in family policy concerning language learning and teaching in the child's family and social environment. The first is that unlike what was believed ten years ago that the best way was for one parent to speak in a language (dominant) and the other in the minority language, now it is understood that it is more effective for both parents to promote the minority language and one of the two gradually introduce the majority, achieving more excellent intergenerational transmission of language.

Second, this component is related to the effort made by the parent to maintain the conversation using a single language, the minority, avoiding the di-lingual, which is the parent's conversation in one language and the son's response in another.

Finally, the third element related to family communication policy is the excessive authoritarian coercion of parents on the use of a single language. This approach can be ineffective in promoting family harmony and well-being.

Socio-economic status and immigration

Socioeconomic status usually harbors other concepts, such as degree of education, economic income, and occupational prestige, creating different levels of social order (Hoff, 2006). According to Hoff (2006), when socioeconomic status is related to child development, the importance of the mother's education degree can be pointed out since, according to research results, the influence is significant to child development. When three types of mothers are observed (according to this line of research)—namely, mothers

of low resources or those dependent on social assistance, working-class mothers, and professional mothers—there is a notable difference in conversations at home. In high-economic-status households, around 215,000 words can be used versus 125,000 in working-class households, and in low-socio-economic-status households, only 62,000 words can be used during the first two years of life (Hoff, 2006).

Furthermore, it's crucial to note that in the United States, bilingualism is a prevalent phenomenon often associated with immigration and socioeconomic status. It's been reported that nearly one-third of children under five years old in the US use more than one language at home and in school settings, making it a shared experience (Surrain, 2021). Ortega (2020) highlights that in the United States, the individuals who speak inherited language are diverse, including indigenous groups, colonizers, and various immigrant groups, each with their unique linguistic heritage.

Gonzalez-Gomez et al. (2020) underscore the challenges faced by children from low socioeconomic status, who are more likely to experience reading difficulties, poor vocabulary, less complex expressive language, and lower receptivity. Hartanto et al. (2019) further report that these children may be at a higher risk for delays in executive function development due to resource limitations or absence. Florit et al. (2021) echo these findings, highlighting that bilingual children from low socioeconomic status, who are predominantly from language-minority immigrant families, are particularly vulnerable to language and literacy difficulties, often performing below their monolingual peers from middle-class backgrounds and lacking in societal language vocabulary, which is typically their second language.

Linguistic Stewardship

Observing the social factors involved in language development in the bilingual or multilingual context of people who are minorities in the USA, Pontier and Riera (2022) propose the importance of being stewardship of language, referring to the imperative need to combat language-related trauma, creating spaces that offer opportunities and promote children's home language. Translanguaging is how the bilingual experiences the environment as a flexible linguistic practice. Bilingualism is much more than the sum of using two languages efficiently; it is how the person can perform actively and competitively to achieve goals and achieve tasks (Pontier & Riera, 2022).

Protective Factors

Protective factors are components that limit the harmful effects of specific circumstances on the child's development. These factors are conditions that decrease, minimize, and buffer the risks of adverse factors. Protective factors benefit the acquisition of skills such as linguistics (Araujo et al., 2020). Longitudinal research has shown that protective factors (as well as risk factors) directly influence language development, family and community support, early childhood education, and social-emotional skills (Short et al., 2019). According to the research results, among the variety of protective factors, there are at least two different types that openly favor the development of the child in general and with a fundamental role in the development of language, apart from helping in the social and cognitive area, the factors are early intervention services and spirituality.

Early intervention services are provided from birth to approximately five years of age in children with established medical conditions or at risk of developmental delays. They aim to support the child and family in meeting their needs. These services, locally,

nationally, and internationally, can help families achieve good outcomes, generate economic benefits, and decrease the cost of health, education, and even welfare assistance. A well-implemented service effectively reduces costs to society and prevents future problems (Romero-Galisteo et al., 2020).

Also, according to Gatt and O'Toole (2017), early identification of children at risk of difficulties is critical because recognizing these challenges allows them to assist them with early intervention services, which are beneficial to children's language development and their development in general. Early intervention services are based on evidence-based information and practices, which is an approach that offers an integration of the best research evidence combined with clinical expertise obtained through randomized controlled trials (RTCs), systematic reviews, and meta-analyses. This information guides decisions in health practices and promotes new research (Impelizzeri & Bizzini, 2012). **Spirituality** can be defined as an internal, innate life nourished with love and healthy interpersonal relationships, which also helps to express joy, compassion, and wonder for life. Spirituality is fostered by a loving environment full of opportunities that facilitate a diversity of virtues (Mata-McMahon, 2019). Spirituality in children creates spaces where healthy development fosters resilience and acts with an anti-stress effect.

On the opposite side, a lack of spiritual development is related to narcissism, destructive behaviors, bullying, and even feelings of emptiness and may even be linked to mental health (Mata-McMahon, 2019). Spirituality can also be observed as a protective factor against social conditions in the person's development environment. Werk et al. (2020) proposed that spiritual development may be present in any child because spirituality can aid in developing coping skills needed to mitigate any emotional,

cognitive, or physical strain. Fitzgerald and Berthiaume (2022) explained that spirituality had been observed as a protective factor buffering mental and health problems because spiritual practices such as prayer, mindfulness, and meditation have decreased mental health problems associated with childhood issues.

In addition, spirituality is an essential component in attachment relationships. It is proposed that there are two pathways between social attachments and attachments to spirituality or God. One is the pathway of "correspondence," where both attachments are observed as correlative. When social attachments are strong, the person perceives God positively and can develop a deeper intimacy with Him; the other pathway is the "compensative."

When a person grows up in an environment of insecure attachments and parental insensitivities, there is a need for security, and the mechanism to compensate for that need is through spirituality and religious conversion (Goodman et al., 2022). In one way or another, spirituality, according to Goodman et al. (2022), is a productive coping mechanism against the consequences of challenging social environments by moderating the effect and promoting healthy outcomes.

Biblical Foundations of the Study

In this research study's biblical foundation, it is essential to review the biblical concepts of child development, the importance of language development, and aspects of the social environment surrounding the child. In addition, a question arises: What is the biblical perspective about childhood? In general terms, it can be noted that 1. Children are part of God's creation and plan. "God blessed them and said to them, "Be fruitful and increase in number; fill the earth and subdue it. Rule over the fish in the sea and the birds

in the sky, and every living creature that moves on the ground" (*New International Version Bible*, 1973/2011, Gen. 1:28).

After Adam and Eve's creation, God commanded them to multiply and have children as part of the original family plan; 2. Children are a gift from God. The book of Psalms 127: 3 says, "Children are a heritage from the Lord, offspring a reward from him" (*New International Version Bible,* 1973/2011, Psalm 127:3); 3. Children need guidance and help to form a solid foundation in developing all their areas. "Start children off on the way they should go, and even when they are old, they will not turn from it" (*New International Version Bible*, 1973/2011, Prov. 22:6) 4. Vulnerable children have special attention in the scripture, such as orphans, displaced persons, and children in poverty, a particular group whom God asks to be given attention and care. "Do not oppress the widow or the fatherless, the foreigner or the poor. Do not plot evil against each other" (*New International Version Bible*, 1973/2011Zech. 7:10); 5. God blesses children. Scripture says, "And he took the children in his arms, placed his hands on them and blessed them" (*New International Version Bible*, 1973/2011, Mark 10:16).

Child Development

Werk et al. (2021) have stated that whatever form of child development (motor, linguistic, social, or cognitive), it should include the spiritual area, a functional expression of complex brain processes. The Jewish Agency for Israel (2005) has stated that the Jewish perspective of the upbringing and development of the child involves a central word, “commitment,” acquired with the child to the family, the community, and the nation. The commitment is because children are the vehicle of transmission of the biblical heritage.

According to this agency, in Judaism, childhood is considered a period of purity, joy, beauty, a symbol of creation, and a time of development as a human being. However, critical thinking about good and evil is only partially developed, so the parent or caregiver is responsible for guiding it. Deuteronomy 11:18-20 says, "Fix these words of mine in your hearts and minds; tie them as symbols on your hands and bind them on your foreheads. Teach them to your children, talking about them when you sit at home and when you walk along the road, when you lie down, and when you get up. Write them on the doorframes of your houses and on your gates" (*New International Version Bible*, 1973/2011), also Proverbs 1:8 says, "Listen, my son, to your father's instruction and do not forsake your mother's teaching" (*New International Version Bible*, 1973/2011) pointing out the importance of the child paying attention to and following the instruction of the adults around and caring for him.

According to this perspective, childhood shapes personality and develops cognitive and social skills. This process of development is the complement and result of God's creation. It is the time to learn and explore. The development of the child is an internal and personal process, however, and as observed above, there are external influences driving and shaping this process. Among these external social components are poverty and immigration. What is the biblical perspective about this?

Social Components Affecting Child Development

Poverty

The Bible presents Poverty in two ways. First, it is a problem we should not be indifferent to and try to solve; conversely, it is a vehicle of God's grace. The scriptures point out that Poverty will always exist, but at the same time, they declare that it is

necessary to address it. "There will always be poor people in the land.
Therefore, I command you to be openhanded toward your fellow Israelites who are poor and needy in your land: (*New International Version Bible*, 1973/2011, Deut. 12:15), "Speak up and judge fairly; defend the rights of the poor and needy" (*New International Version Bible*, 1973/2011, Prov. 31:9),

"Defend the weak and the fatherless; uphold the cause of the poor and the oppressed" (*New International Version Bible*, 1973/2011, Psalm 8:3).

It can observe the relationship of Poverty to God's grace c in most of the New Testament, where the concept of Poverty goes beyond the material and is synonymous with humility and simplicity, and where wealth overshadows the sincerity of heart and desire to follow Jesus and His commandments as did the rich young man "Jesus looked at him and loved him." "One thing you lack," he said. "Go, sell everything you have and give to the poor, and you will have treasure in heaven. Then come, follow me. At this the man's face fell. He went away sad because he had great wealth" (*New International Version Bible*, 1973/2011, Mark 10:21-22), "It is easier for a camel to go through the eye of a needle than for someone who is rich to enter the kingdom of God" (*New International Version Bible*, 1973/2011, Mark 10:25). Poverty is often related to immigration both in research results and in the scripture which offers various examples such as in the story of Ruth, Joseph, and Moses himself.

Immigration

From biblical times to the present day, there is immigration, which occurs in most cases forced by economic and security circumstances. However, the solution itself brings with it many problems that also affect, in one way or another, the family and, in many

direct areas, the development of children. The United States, as well as many the countries of the world, are involved in waves of foreign migrants in search of new opportunities.

However, the process of reaching the final goal entails many conflicts. The Bible shows us several examples that develop in similar contexts, for example, the case of Ruth where her story begins as her family decides to leave their homeland and emigrate to another nation, and after multiple traumatic situations, Ruth stays in a foreign land facing widowhood, poverty, work, and even humiliation. Like Ruth's story, many immigrants are prone to adverse situations, including poverty, rejection, and culture shock. Ruth's story ends positively through the intervention and hospitality of Boaz, who in one way or another fulfilled the commandments of Leviticus 19:33-34 "When a foreigner resides among you in your land, do not mistreat them. The foreigner residing among you must be treated as your native-born. Love them as yourself, for you were foreigners in Egypt. I am the Lord your God" (*New International Version Bible*, 1973/2011). Scripture describes something interesting in Psalm 107:33-43, where it shows God's goodness to the stranger, indicating that although the strangers of the world suffer from desolation, uncertainty, and poverty, things can change abruptly, growing in number and turning into desolation and peace "He turned rivers into a desert, flowing springs into thirsty ground, and fruitful land into a salt waste, because of the wickedness of those who lived there. He turned the desert into pools of water and the parched ground into flowing springs; there, he brought the hungry to live, and they founded a city where they could settle. They sowed fields and planted vineyards that yielded a fruitful harvest; he blessed them, and

their numbers greatly increased, and he did not let their herds diminish" (*New International Version Bible*, 1973/2011).

Summary

The interest in researching human development in its different areas is familiar and, on the contrary, has been growing consistently during the last decades. The development in general, as well as in each of its areas, can be seen from two perspectives: the nature side points out the physiological part, including the development of the brain, and on the other hand, there is the nurture part, which highlights the social and environmental influences surrounding the development of the child. When looking at the areas of development, it is essential to note that language development closely interacts with the individual's cognitive and social development.

Observing language development includes understanding receptive and expressive language concepts and understanding differences depending on status, bilingual and monolingual. Bilingualism has been associated with advantages at the cognitive level. However, to understand the theoretical basis of this research, it is essential to point out that despite the advantages of bilingualism, a social background influences development. Among the social factors that can be observed, there is evidence that socioeconomic level has a remarkable influence. Therefore, the low economic level identified as poverty will be an essential variable to observe. One of the social factors interacting with bilingualism and poverty is immigration, which is one of the most frequent causes that have forced children to grow up exposed to a diversity of languages and, in many cases, to poverty.

In summary, the information obtained through the literature review must provide evidence of bilingualism as an agent of change in the brain, behavior, executive functions, and social relationships, among other things. However, it is necessary to continue investigating the interaction between bilingualism and cognitive development and social factors, such as poverty, to obtain more results that provide a better understanding of child development. In addition, it is important to provide current information on early intervention services that can help prevent and treat communication delays, which have been frequently observed in children exposed to bilingualism despite the cognitive advantages it offers. Early intervention services are seen as a protective factor to delays in development in general, including language. Another important protective factor to watch is the child's spiritual development. The spiritual development of the child has been identified as a buffer element in childhood that can help to cope with adverse experiences as well as those derived from poverty.

CHAPTER 3: RESEARCH METHOD

Overview

This chapter contains the questions that guided the research and the hypotheses that proposed the relationships between the variables and the results from the statistical analysis. Next, the chapter described the participants, the research design, and the variables that interacted during the study process, including a description of the procedures and instruments to use. Finally, this chapter will conclude by pointing out the limitations and assumptions of all research.

Research Questions and Hypotheses

Research Questions

RQ1: What is the correlation between language (expressive and receptive) and cognitive skills in children (18-36 months) from bilingual and monolingual family contexts based on the scores of DAYC2 (eligibility tool used in early intervention services)?

RQ 2: What is the correlation between socio-economic status (poverty/non-poverty) and language and cognitive skills in children (18-36 months) from bilingual and monolingual family contexts based on the scores of DAYC2 (eligibility tool used in early intervention services)?

RQ 3: May bilingualism and poverty at an early age predict language delays in children (18-36 months)?

Hypotheses

Hypothesis 1: There is a significant difference between the language and cognitive development in children growing up in bilingual family background from monolingual children.

Hypothesis 2: There is a positive relationship between poverty and language development in bilingual children and a significant difference between bilingual and monolingual children.

Hypothesis 3: There is a positive relationship between socioeconomic status and language skills; therefore, lack of poverty may predict delays or risk for delays in language development in bilingual children at an early age (18-36 mos).

Research Design

The present study used a quantitative correlational study examining the relationship between language development (accounted by scores awarded in expressive and receptive language eligibility testing items), cognitive development (accounted for cognitive skills that are necessary to switch between two languages and obtained by test score results), and examined how poverty (based in the US federal poverty line) interacts with the relationship between language development and cognitive development in developmentally typical children who are exposed and not exposed to bilingualism at an early age (18 to 36 months).

The research design, a quantitative correlational study, was chosen to try to determine the relationship between three variables, in this case, language development, cognitive development, and the interaction with poverty, through the observation and analysis of statistical data. This non-experimental design indicates that the researcher did not manipulate or control the variables but observed the interaction and influence to

determine whether it is statistically significant. The variables were quantified during this research, and the relationship was observed and measured to determine their relationship and draw conclusions that can bring new knowledge to the subject. It is necessary to observe the correlational method to understand why this research design is appropriate for this study. According to Martin and Bridgmon (2012), the primary purpose is to explore the relationship of two or multiple variables in addition to predictions between variables. This research design is commonly used in quasi-experiments, where correlation points out the relationship between the variables that in this specific study deals with language development, cognitive development, and language status (bilingual/monolingual) observing in addition to the impact of socioeconomic status on them (presence or absence of poverty).

Participants

The study targeted children between 18 to 36 months with typical development (no pre-existent medical conditions) and exposure to one language, preferably English, or bilingualism, preferably Spanish/English. The children participants were referred to the North Carolina Infant-Toddler Program (NC ITP). The exclusion criteria included children out of the age range (18-36), children with established medical conditions, and non-participants of the early intervention services.

Study Procedures

An Institutional Review Board (IRB) application was completed during this process to receive the approval; obtaining final approval from the North Carolina Infant/toddler program was necessary. The participants recruited are participants of the local agency of Early Intervention Services located in Winston-Salem, North Carolina,

which works directly with the state's Infant-Toddler Program (ITP). The information was collected from the eligibility process of the ITP, which examines language and cognitive development (among other areas) using items and scores from the Developmental Assessment of Young Children 2 (DAYC2). The family home language and the socioeconomic background (poverty status) were identified using myAvatar 2021.01.00, a health information database that manages the information of the entire state's infants and toddlers participants in early intervention services.

The sample size reached throughout this study was 500 participants (250 English speakers and 250 non-English speakers) from six counties across the state of North Carolina. A written request was submitted to the principal director of the state of North Carolina and the ITP data manager to use information from the ITP and its database, which was provided securely.

Instrumentation and Measurement

The present study examined the correlation between language (expressive and receptive) and cognitive development (accounted by cognitive skills) in children exposed and non-exposed to bilingualism, and the interaction with poverty was examined through the scores awarded during the eligibility process completed by the agencies of early intervention services. The *instruments* used during this study research were Developmental Assessment of Young Children 2 (DAYC2) and myAvatar 2021, which will be described below.

Developmental Assessment of Young Children 2 (DAYC2) by Judith K. Voress, Ph.D., Taddy Maddox, and Donald D. Hammill, Ph.D. (ProEd). DAYC2 is a norm-referenced measure of children's development status and possible delays in the five

domains (cognitive, language, social, adaptive, and physical areas) from birth to 5 years old. DAYC2 uses interactive activities, observation, and parent reports. The standardization for DAYC-2 data was collected between 2009 and 2011 with a sample of 1,832 children. The sample's demographic characteristics were similar to those of the 2010 U.S. Census data in terms of gender, ethnicity, parents' education level, household income, geographic region, and disability status. A minimum correlation of .90 is considered satisfactory because it is the recommendation for tests used to make crucial decisions. DAYC 2 presented satisfactory internal consistency in all the subgroups with coefficients ranging from .82 to .99. DAYC-2 findings are used to make important decisions about early childhood, including the need for services (Swartzmiller, 2014). Is important to point out that DAYC2 is similar to DAYC, and the results were compared with the Battelle Developmental Inventory–Second Edition (BDI-2; Newborg, 2005) and the Developmental Observation Checklist System–Second Edition (DOCS-2; Hresko & Sherbenou, in press) to evaluate criterion-prediction validity, and it was found moderate to significant correlation (Swartzmiller, 2014). The other *instrument* used is myAvatar 2021, a state-level database where the early interventionists input assessment results, observations, individualized outcomes, health information, and socioeconomic background data. The data management by myAvatar used for programs such as the North Carolina Infant Toddler Program (NC ITP) includes information on services, assessments, and interventions from the time of the referral process up to the transition to preschool services. The NC ITP, also known as Part C, works based on family and children's rights derived from the Individuals with Disabilities Education Act (IDEA), a federal law ensuring services and special education for students with disabilities.

The scale of measurement used during this research study is a Pearson Correlation coefficient estimated for two binary variables: language and cognitive development in children exposed to bilingualism and in children exposed to only one language. In addition, a correlation was observed between language development and poverty. A Simple Regression Analysis helped predict bilingualism's effect on language development.

Operationalization of Variables

Language development—This variable is ordinal and will be measured by the total score on the items related to language development according to the age group in the DAYC2.

Cognitive development—This variable is ordinal and will be measured by the total score on the items related to cognitive development according to the age group in the DAYC2.

Poverty—This nominal variable was divided into two categories according to the federal poverty line guidelines. The categories are under or over the poverty line.

Data Analysis

Two types of statistical analyses were used to observe the correlation between language development and cognitive development in children exposed to bilingualism compared to children exposed to a single language in its immediate context. The first analysis performed was a Pearson correlation, where the association of two dichotomous variables was observed, and both variables were interchangeable, so it was a symmetric measurement. The assumption used in this analysis is based on a linear relationship between dichotomous variables, similarly, the correlation between language development

and socioeconomic level was observed, where poverty is the variable to be followed, delimited by the federal parameters of the poverty line in the United States.

On the other hand, another statistical tool, simple regression analysis, was essential. This tool provided quantified information derived from statistical studies about the relationship between the variables mentioned to estimate how the variables impacted language development, information that may benefit the prevention of developmental delays.

Delimitations, Assumptions, and Limitations

There were at least four *assumptions* presented in this study. First, as an assumption, it was possible to determine the existence of two dichotomous variables, delay and non-delay status, in language development for the participants. Another dichotomous relationship is the language status, which is pointed out as monolinguistic versus bilingual language skills. The second assumption was to observe the character of an ordinal variable because high or low levels of the participants' socioeconomic status can be identified. The third assumption was the use of discrete data identified in the number of participants: the exact number of children exposed to bilingualism and the exact number of children from a monolingual background. A fourth assumption was the existence of a linear relationship between the variables where, in positive or negative ways, determining if there was (or is not) a statistically significant relationship between the variables.

Four *limitations* were mentioned above as part of this research study. The first one refers to the recruitment process of participants because to be included in this research study, children should be participants of the North Carolina Early Intervention program;

children who have yet to be referred to the program will not be evaluated and cannot provide information. Therefore, there is a limitation to reaching them. The second is about the instruments for collecting data, which are efficient and evidence-based but limited to only two instruments. Since the ITP conducts the evaluation, there is a limitation to the integration of other measurement tools. Third, social development observation is limited to socioeconomic status and bilingualism, which is positive since they are quantifiable variables. However, at the same time, they are only a tiny sample of the variety of social elements that may interact with child development. Finally, there is a limitation related to the replication of the study, indicating that the person interested in repeating this study must know in advance about the system used by early intervention programs and possibly understand the processes of child development.

Summary

This chapter explained each component of the research method, including the one considered appropriate, in this case, a Pearson Correlation analysis and a Simple Regression. It also described the participants and the procedures that were carried out during the study.

Additionally, this chapter described the instruments that were used for the statistical analysis of the data obtained and the operationalization of the variables to be studied, ending with a review of the limitations estimated to be presented during the research development. The following chapter will present the information related to the results derived from the research after applying the measurements and interpreting the results to interpret them later and apply them to the general topic.

CHAPTER 4: RESULTS

Overview

This chapter outlines the research's purpose, data collection, and research questions. This quantitative correlational study examines the relationship between language and cognitive development in interaction with poverty in developmentally typical children (no established medical conditions) growing up in a bilingual or monolingual context at an early age (18 to 36 months).

Data was collected from a North Carolina Infant-Toddler Program (NC ITP) database. Children between 0 and 3 are referred to be evaluated for development concerns and to identify potential delays in any of the five developmental areas. The researcher received the data directly from the program's data manager's office, where 500 participants who met the inclusion criteria were sought. The present study made data handling wholly confidential and secure.

There are three research questions: RQ1: What is the correlation between language (expressive and receptive) and cognitive skills in children (18-36 months) from bilingual and monolingual family contexts based on the scores of DAYC2 (eligibility tool used in early intervention services)? RQ2: What is the correlation between socio-economic status (poverty/non-poverty) and language and cognitive skills in children (18-36 months) from bilingual and monolingual family contexts based on the scores of DAYC2 (eligibility tool used in early intervention services)? RQ3: May bilingualism and poverty at an early age predict language delays in children (18-36 months)? These questions were the guidelines used by the researcher to consider the study problem.

Descriptive Results

The sample of this research consisted of 500 participants from the Infant/Toddler Program of the state of North Carolina who were referred for developmental concerns. Participants were not identified with any pre-existing medical conditions at the time of referral. Participants come from six counties in the Northwest part of the state. The group of 500 participants is divided equally by 250 children identified from an English-only context and 250 children from a bilingual context. Most non-English speakers speak Spanish (244), and six participants from Mon-Kmer, Chinese, French Creole, and other backgrounds identified only as non-English.

In terms of socio-economic background, 64.8% of the participants identified from monolingual contexts qualify for Medicaid to meet their medical expenses, indicating that they fall into the income categories below the poverty level according to federal guidelines or there is some social risk involved, such as foster homes, and 35.2% have private health insurance. On the other hand, 92.8% of participants with a bilingual background qualify for Medicaid, and only 7.2% have private health insurance. No other aspect of participants' personal information was considered due to confidentiality reasons.

Figure 1

Number of Participants Monolinguals Under Poverty Line (Medicaid) vs Over Poverty Line (Private Insurance).

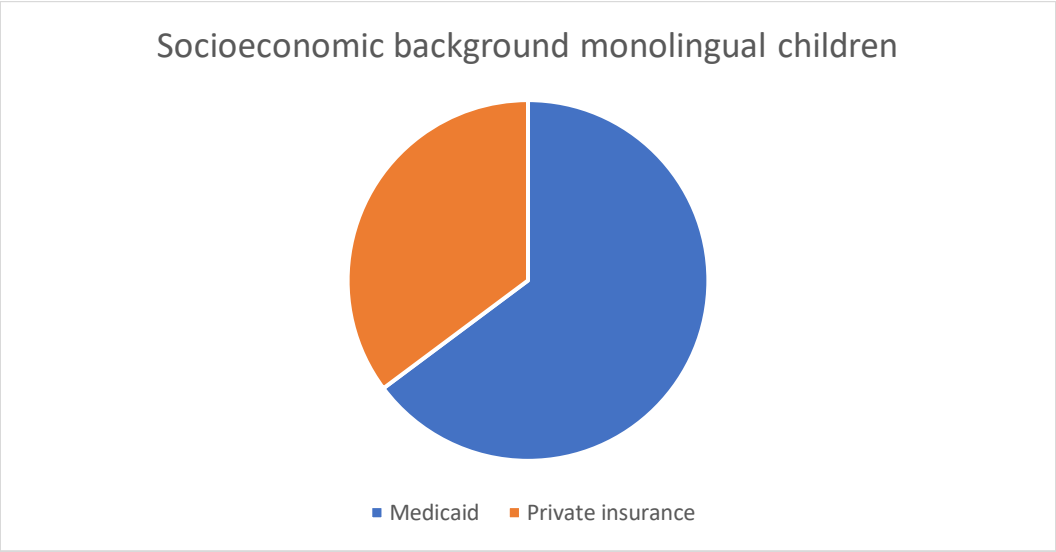
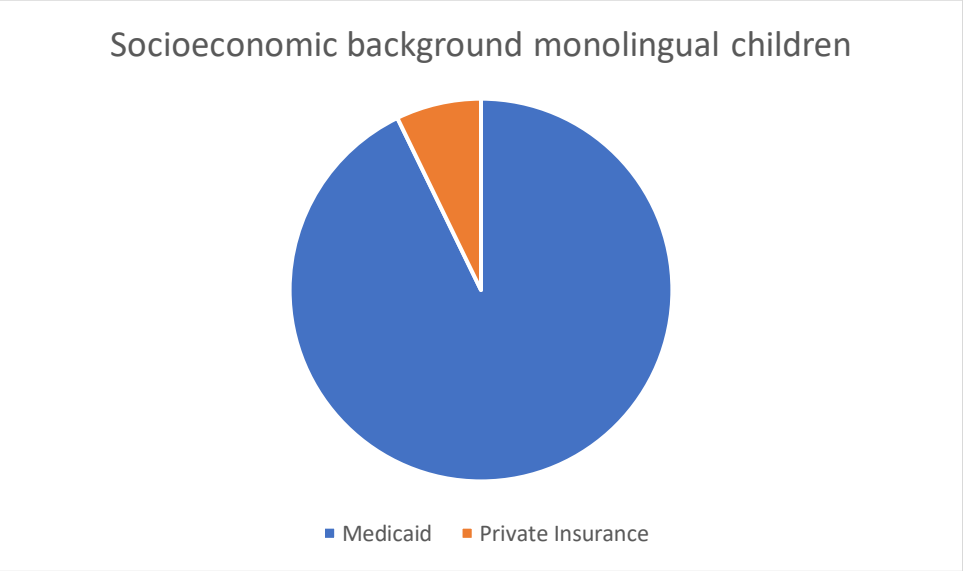


Figure 2

Number of Participants Bilinguals Under Poverty Line (Medicaid) vs Over Poverty Line (Private Insurance).

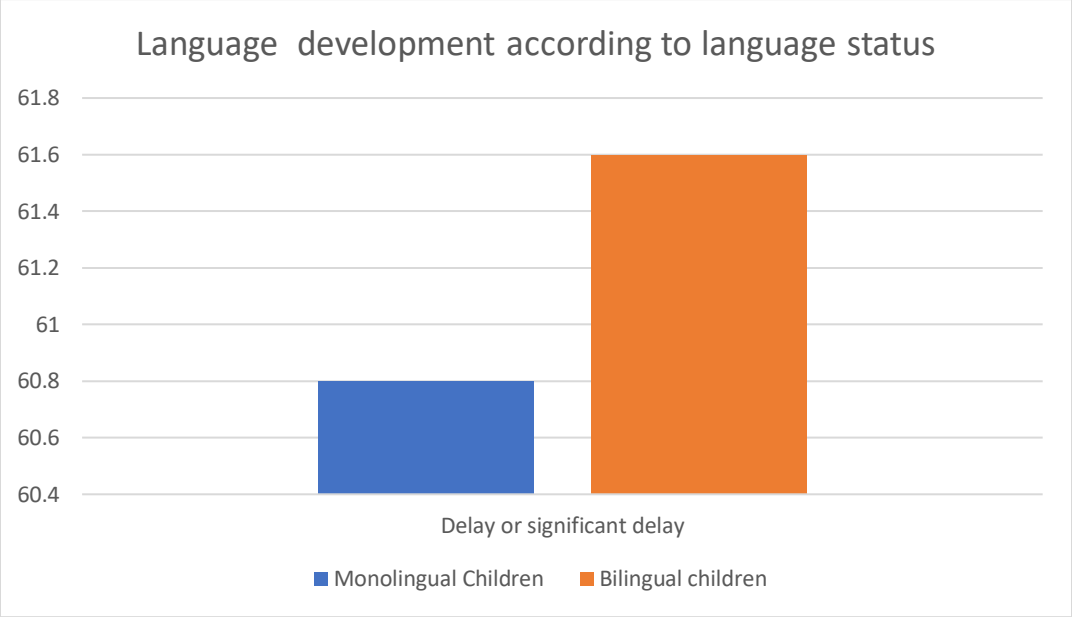


The mean referral age in the monolingual group is 23.20 months, and for participants from bilingual backgrounds, it is 24.27 months. Finally, of the total number of participants referred from a monolingual background, 60.8% were identified as having

a delay or significant delay in language, while in the group of participants with a bilingual background, 61.6% were identified in the same categories.

Figure 3

Percentage of Children (Monolingual and Bilingual) in the Categories of Delay or Significant Delays at the Time of the Evaluation.



The present research used the statistical analysis of Pearson correlation and regression analysis, where positive correlations were obtained between the proposed variables, which indicates that with the increase of one of the variables, there is a tendency for the other variable also to increase. The analysis also presented a high level of statistical significance of less than 0.05, even reaching <.001, which can be considered highly statistically significant with the chance of less than one in a thousand being wrong.

The mean of cognitive development of the group of participants N=500 is =85.74, with a standard deviation of =8.94. The mean of language development of the whole group of participants N=500 is =78.97 for cognitive development with a standard deviation of =9.96. In addition, it is possible to observe that exist differences in the mean and the standard deviation between the language and the cognitive development from the group of participants of monolingual children than bilingual children. The next tables summarize the mean, median, and mode of the complete group of participants. After that, the next table shows the mean and standard deviation by group according to language status (monolingual and bilingual) and divided by skills (cognitive and language).

Table 1

Mean, Median, and Mode Between the Cognitive and Language Scores of all participants N=500

Frequencies

Statistics

		Cognitive	Language
N	Valid	500	500
	Missing	0	0
Mean		85.7340	78.9650
Median		87.0000	75.5000
Mode		87.00	70.00

Table 2

Mean and Standard Deviation Between the Cognitive and Language Scores by Language Status Groups (Monolingual vs Bilingual)

	Mean $\bar{X}$	Standard Deviation σ
Language development Monolingual children	79.46	11.07
Cognitive development Monolingual children	85.54	9.83
Language development Bilingual children	78.46	8.70
Cognitive development Bilingual children	85.93	7.96

Study Findings

This research developed a quantitative correlational study examining the relationship between language development and cognitive development in participants between 18 and 36 months of age. Furthermore, this study examined how poverty interacts with the relationship between language and cognitive development. The research design determined the relationship between three variables-- language development, cognitive development, and the interaction with poverty--through the observation and analysis of statistical data. This design is non-experimental, indicating that the researcher did not manipulate or control the variables but observed the interaction and influence and determined whether it is statistically significant. In addition, a regression analysis was performed to see if socio-economic status (mainly poverty) could predict language development in children during early childhood.

The findings of this research matched the three research hypotheses.

HO1: There is a significant difference between the language and cognitive development in children growing up in bilingual family background from monolingual children.

A Pearson correlation was computed to assess the linear relationship between language skills (including receptive and expressive) and cognitive skills. The hypothesis was supported because there was a positive correlation between the two variables r (498) =.71, p<.001, with a large effect size at an alpha level of 0.01.

Table 3

Correlation between Cognitive and Language Development in all Participants of the Study.

➔ **Correlations**

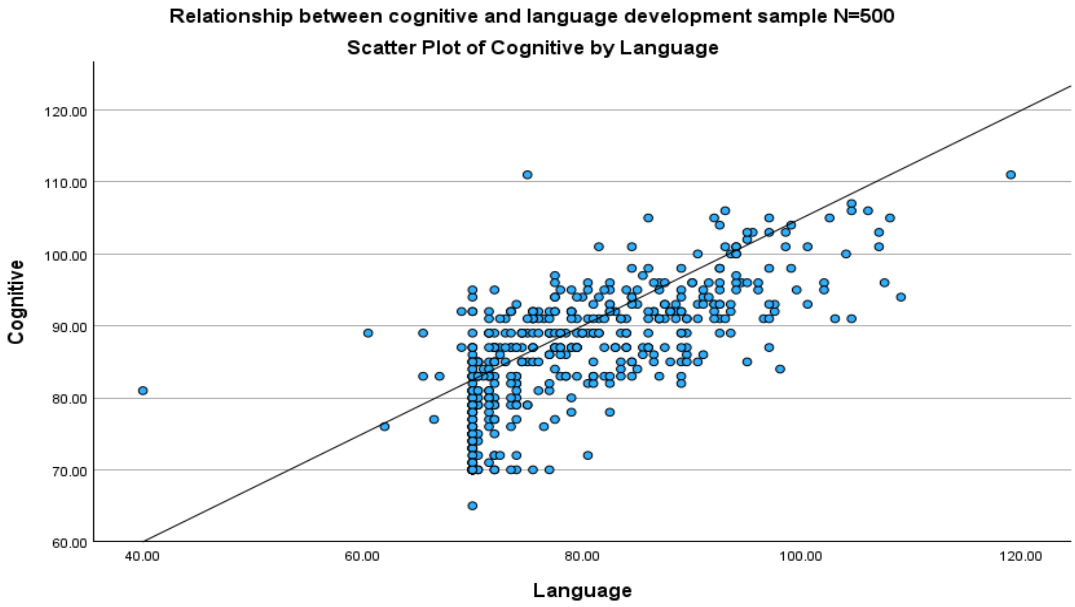
Correlations

		Cognitive	Language
Cognitive	Pearson Correlation	1	.714**
	Sig. (2-tailed)		<.001
	N	500	500
Language	Pearson Correlation	.714**	1
	Sig. (2-tailed)	<.001	
	N	500	500

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 4

Relationship Between Language and Cognitive Development in all participants



The same hypothesis leads us to two other correlations with the same variables but looking at the sample differently. The first correlation points to the relationship between cognitive development and language development in the participants from monolingual backgrounds (i.e., the home language was identified as English only). Subsequently, the relationship between the cognitive and language variables will be examined in the group identified as coming from a bilingual background. A Pearson correlation was computed to assess the linear relationship between language skills (including receptive and expressive) and cognitive skills. There was a positive correlation between the two variables r (248) =.72, p<.001, with a large effect size at an alpha level of 0.01.

Table 4

Correlation Between Cognitive and Language Development in the Group of Monolingual Children.

Correlations

[DataSet2]

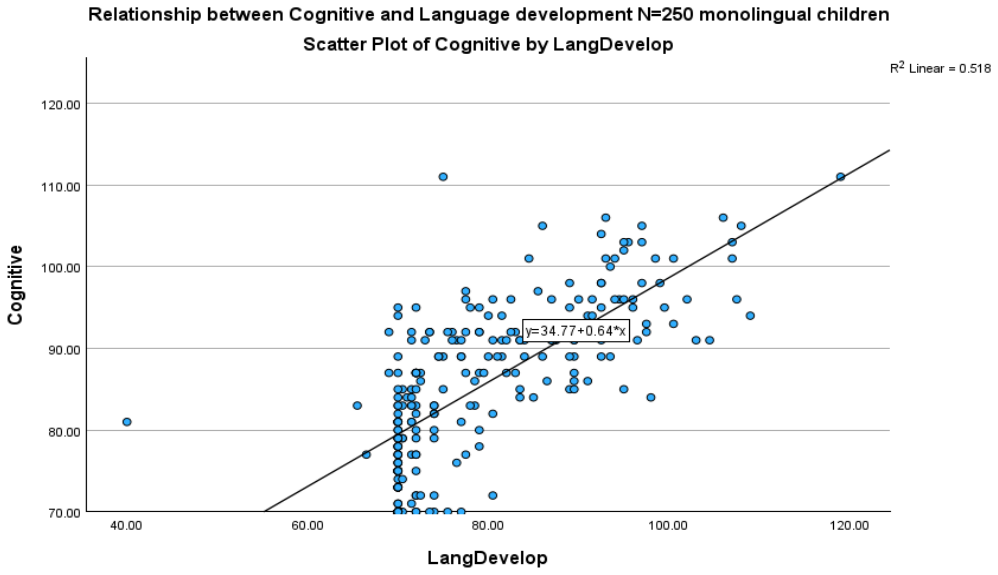
Correlations

		Cognitive	LangDevelop
Cognitive	Pearson Correlation	1	.720**
	Sig. (2-tailed)		<.001
	N	250	250
LangDevelop	Pearson Correlation	.720**	1
	Sig. (2-tailed)	<.001	
	N	250	250

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 5

Relationship Between Language and Cognitive Development in the Group of Monolingual Children.



A Pearson correlation was computed to assess the linear relationship between language skills (including receptive and expressive) and cognitive skills. There was a

positive correlation between the two variables r (248) =.71, p<.001, with a large effect size at an alpha level of 0.01.

Table 5

Correlation between Cognitive and Language Development in the Group of Bilingual Children

Correlations

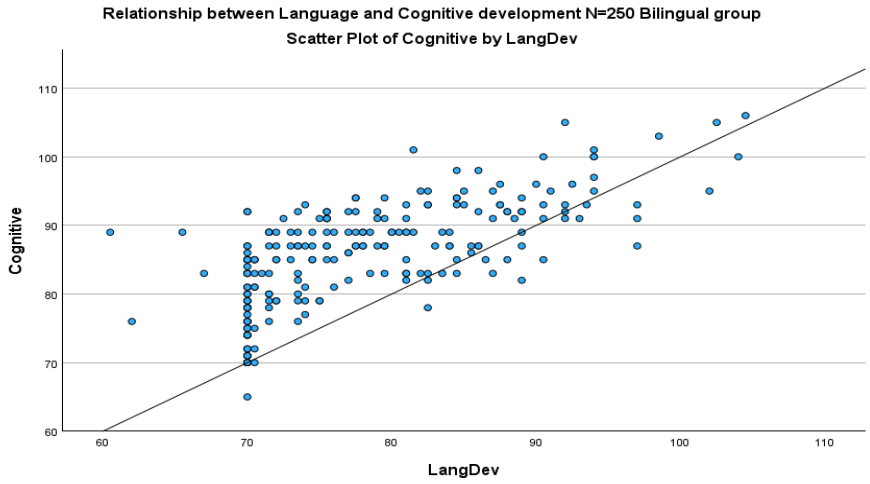
Correlations

		Cognitive	LangDev
Cognitive	Pearson Correlation	1	.710**
	Sig. (2-tailed)		<.001
	N	250	250
LangDev	Pearson Correlation	.710**	1
	Sig. (2-tailed)	<.001	
	N	250	250

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 6

Relationship Between Language and Cognitive Development in the Group of Bilingual Children



The three correlations developed are significant at 0.7, with a slight difference in the group of participants with a single-language background. The effect size is large at an alpha level of 0.01. The present hypothesis was supported by the study results.

HO2: There is a positive relationship between poverty and language development in bilingual children and a significant difference between bilingual and monolingual children.

The first correlation observed between language and cognitive development was among the participants with only one language (English) and who are in the category of poverty or social risk according to the federal guidelines of the poverty line that allows obtaining Medicaid as health insurance. In this research, the number of participants in this category is N=161 (64.4% of the group of participants N=250). It can be pointed out that 67% of this group was found to have a delay in language development. A Pearson correlation was computed to assess the linear relationship between language skills (including receptive and expressive) and cognitive skills in children exposed to only one language at home (English). There was a positive correlation between the two variables r (159) =.67, p<.001, with a large effect size at an alpha level of 0.01.

Table 6 *Correlation between Cognitive and Language Development in the Group of Monolingual Children in the Category of Poverty.*

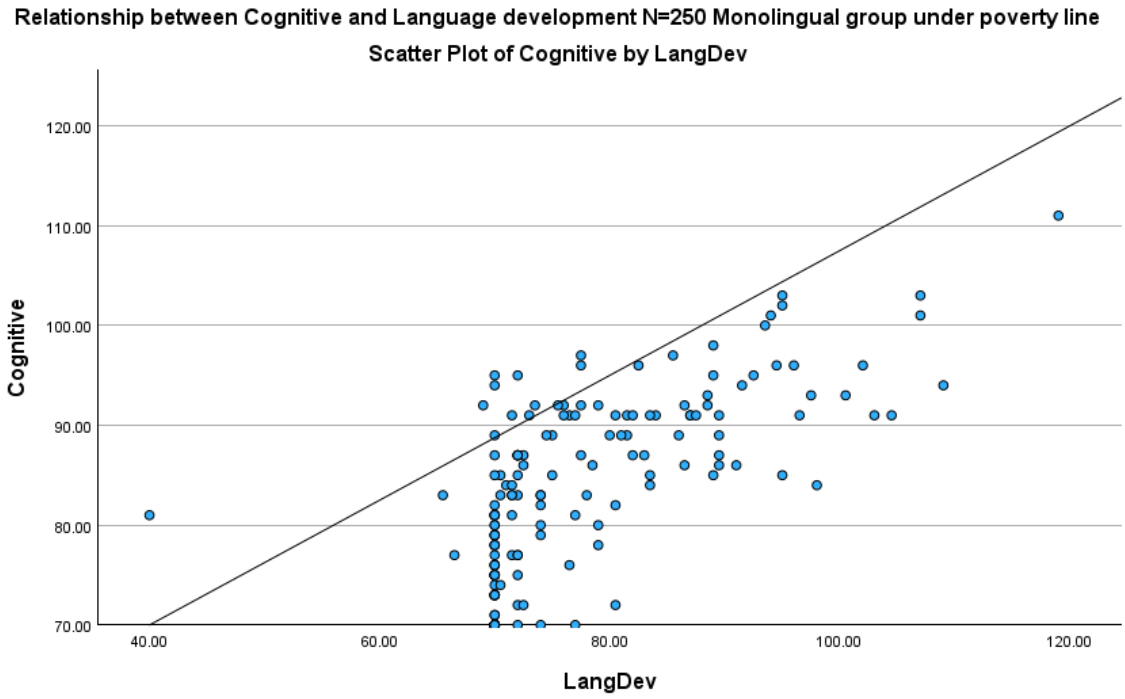
Correlations

		Cognitive	LangDev
Cognitive	Pearson Correlation	1	.674**
	Sig. (2-tailed)		<.001
	N	161	161
LangDev	Pearson Correlation	.674**	1
	Sig. (2-tailed)	<.001	
	N	161	161

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 7

Relationship Between Language and Cognitive Development in the Group of Monolingual Children under poverty line.



The next correlation to be observed in this hypothesis is from the same group of participants (children exposed to a single language) but in the socio-economic category above the poverty line. In this group, there were N=89 participants in this non-poverty

category according to federal guidelines (35.6% of the sample of N=250 monolingual participants), of which it can also be noted that 49.3% were found to have delayed language development. A Pearson correlation was computed to assess the linear relationship between language skills (including receptive and expressive) and cognitive skills. There was a positive correlation between the two variables r (87) =.76, p<.001, with a large effect size and alpha level of 0.01.

Table 7

Correlation between Cognitive and Language Development in the Group of Monolingual Children in the Category of Over Poverty Line.

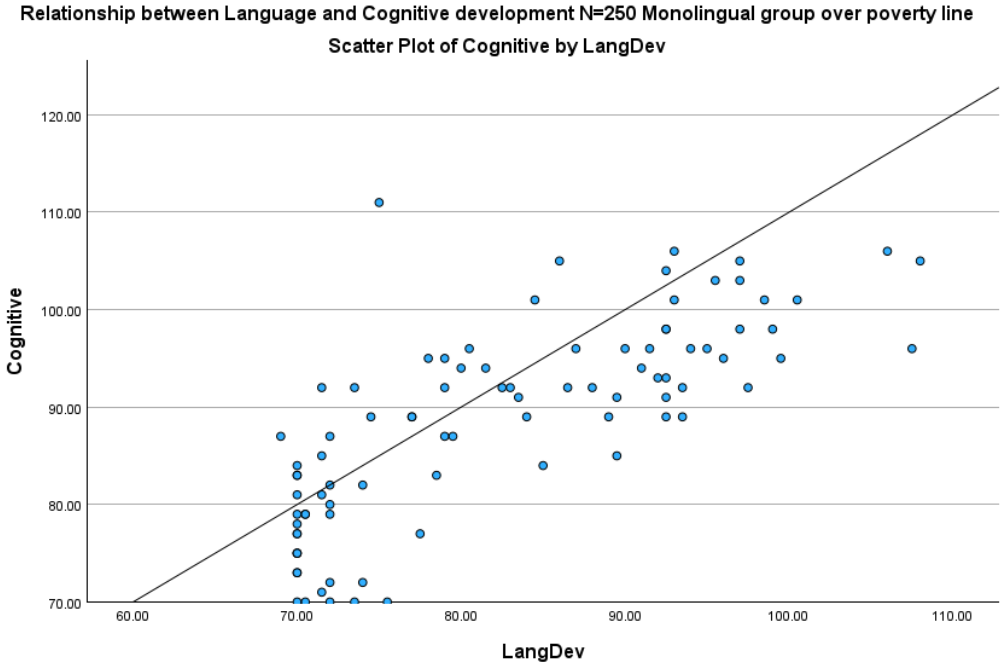
Correlations

		Cognitive	LangDev
Cognitive	Pearson Correlation	1	.758**
	Sig. (2-tailed)		<.001
	N	89	89
LangDev	Pearson Correlation	.758**	1
	Sig. (2-tailed)	<.001	
	N	89	89

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 8

Relationship Between Language and Cognitive Development in the Group of Monolingual Children Over poverty line



Another correlation to observe is the same variables (language and cognitive skills), but in the group of participants exposed to bilingualism in the poverty category according to federal guidelines, from which it can be highlighted that this is the largest group with N=231 out of 250, in other words, 92.4% of this group, In addition, it can be noted that of this group, 63.2% were found to have language delay. A Pearson correlation was computed to assess the linear relationship between language skills (including receptive and expressive) and cognitive skills. There was a positive correlation between the two variables r (229) =.70, p<.001, with a large effect size at an alpha level of 0.01.

Table 8

Correlation between Cognitive and Language Development in the Group of Bilingual Children in the Category of Poverty.

Correlations

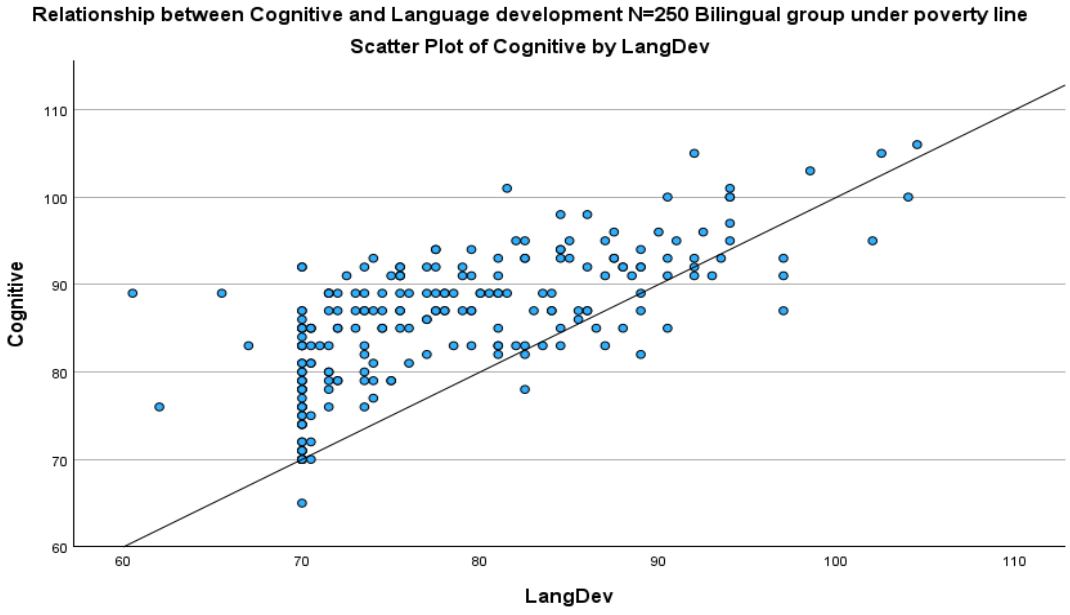
Correlations

		LangDev	Cognitive
LangDev	Pearson Correlation	1	.696**
	Sig. (2-tailed)		<.001
	N	231	231
Cognitive	Pearson Correlation	.696**	1
	Sig. (2-tailed)	<.001	
	N	231	231

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 9

Relationship Between Language and Cognitive Development in the Group of Bilingual Children Under Poverty Line



The last correlation observed in this hypothesis relates to the same group of participants, children from bilingual contexts, in the non-poverty category, as they are above the poverty line indicated by the federal government. This group and category have

the fewest participants, only N=19, showing that it is only 7.6% of the sample of N=250, and of this group, 36.84% is in the category of delay in language development. A Pearson correlation was computed to assess the linear relationship between language skills (including receptive and expressive) and cognitive skills. There was a positive correlation between the two variables r (17) =.80, p<.001, with a large effect size at an alpha level of 0.01. The second hypothesis was also supported by the present correlation.

Table 9

Correlation between Cognitive and Language Development in the Group of Bilingual Children in the Category of Poverty Line.

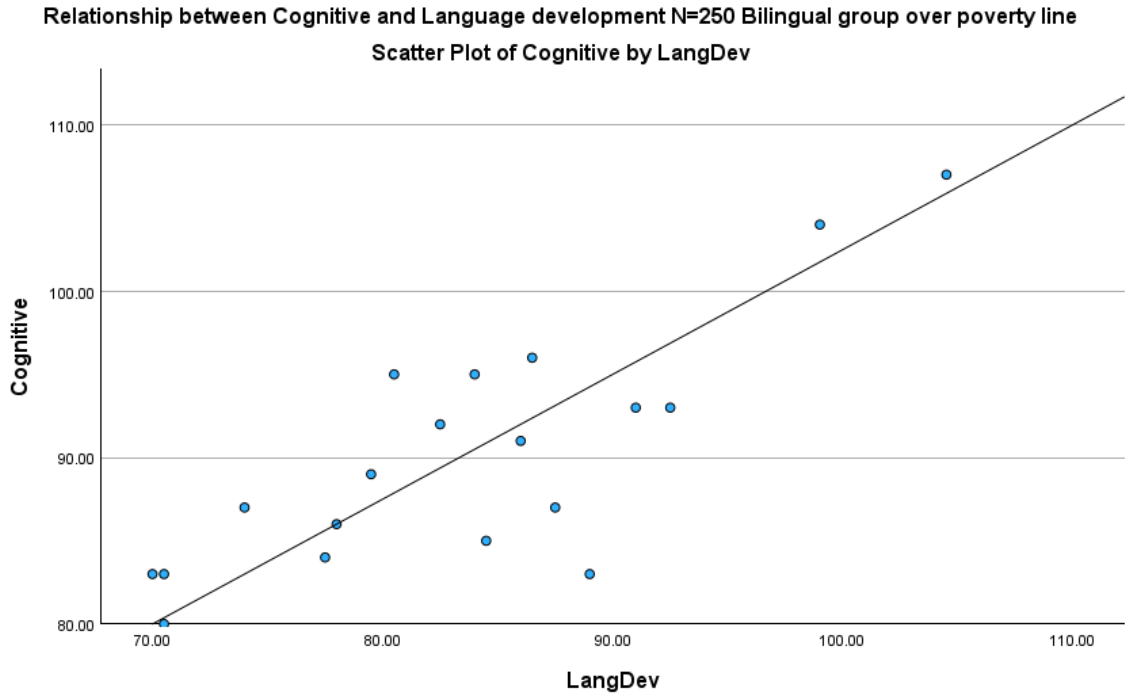
Correlations

		Cognitive	LangDev
Cognitive	Pearson Correlation	1	.804**
	Sig. (2-tailed)		<.001
	N	19	19
LangDev	Pearson Correlation	.804**	1
	Sig. (2-tailed)	<.001	
	N	19	19

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 10

Relationship Between Language and Cognitive Development in the Group of Bilingual Children Over Poverty Line.



HO3: There is a positive relationship between socioeconomic status and language skills; therefore, lack of poverty may predict delays or increase the risk of delays in language development in bilingual children at an early age (18-36 mos.)

To observe this question, a linear regression was used between the language DV and the socio-economic level, which was determined in the categories below or above the poverty line according to guidelines established by the federal government. Simple linear regression was used to test if socioeconomic status determined under the poverty line significantly predicted language development in children between 18-36 months of early childhood. The overall regression was statistically significant ($R^2 = .04$, $p < .001$). It was found that poverty significantly predicted language development ($\beta = 4.76$, $p = < .001$). The analysis provided results supporting the hypothesis.

Table 10

Simple Regression Linear between Language Development and Poverty.

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	73.181	1.364		53.664	<.001
	Poverty	4.757	1.062	.197	4.478	<.001

a. Dependent Variable: Language

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.197[a]	.039	.037	9.77474

a. Predictors: (Constant), Poverty

Assumptions of the test used in this research

As explained above, there are four assumptions regarding this type of statistical analysis, which were observed in the results obtained. First, the variables used in this study belong to continuous scales. Third, no data outliers were presented in the development of this research study. Fourth, in reference to the norm or near-normal distribution of the analyses, it can be said that the Pearson correlation is the linear measurement between two normally distributed variables.

Summary

This chapter presents the analysis of the results of this research, where a positive and statistically significant correlation was found between cognitive skills and language skills in both the bilingual and monolingual groups of participants. Both groups showed

correlations of .70 or more, with a slight difference between them, which shows the importance of the topic. In addition, it can be noted that the sample N=250 of bilingual participants showed an average score in cognitive development of 85.93, and the other group of N=250 monolingual participants showed an average score of 85.54, where one more time, a slight difference was observed between the two groups.

As part of the general demographic analysis, it is important to note that the percentage of participants assessed and found to have a delay in language development is similar in both groups, with a little more than 60%. However, the most significant discrepancy occurs in the socioeconomic area where more than 90% of bilingual children are categorized as living below the poverty level, with a difference of at least 30% of children from monolingual backgrounds. The importance of the results found in this research will be discussed in the next chapter.

CHAPTER 5: DISCUSSION

Overview

The purpose of the present study is based on the observation of the correlation between cognitive and language development and, at the same time, the interaction with the socioeconomic background in early childhood. This chapter discussed the results and their significance through a matching or unmatching process of results and the information obtained in the literature review presented in the first chapters. It is necessary to start recalling the purpose of this research and examine the relationship between language and cognitive development in interaction with poverty in developmentally typical children growing up in a bilingual or monolingual context at an early age.

The literature on bilingualism has different approaches regarding cognitive skills and the interaction with language. On one side, a cognitive advantage is observed in executive functions such as switching skills. On the other hand, some researchers pointed out no advantages, highlighting that families lacking resources do not provide a rich environment enough for children at an early age. In addition to the literature, and according to service coordinators of early intervention services, it is possible to observe a large percentage of children from bilingual backgrounds referred to the services due to language delays, increasing interest in exploring and researching this topic.

It was possible to outline outcomes and to see emerging interest in completing research with these specific groups of participants among the early intervention services. The infant/toddler programs could provide participants growing up in bilingual families/contexts and children with exposure to only one home language. In summary, during this research, it was possible to observe the relationship between the level of two

areas of development in early childhood, the interaction of both variables with a third variable, which is the socioeconomic status of poverty, understanding that early years of life, as has been widely discussed, is a crucial point of development that has a long-lasting effect on human lives.

Summary of Findings

The results of this research are initially organized into three groups; each group corresponds to a specific research question and is related to the three hypotheses proposed previously. After that, the results were analyzed and matched with other topics that can be found openly in the literature review, which can be pointed out as part of the theoretical foundation of this research.

First, it was observed that the relationship between language development and cognitive development in children between 18 and 36 months was hypothesized to be a significant difference and a significant correlation. The correlation between the cognitive and language development in the group of participants was significant, there was a subtle difference between the two groups (monolingual vs bilingual groups).

The second result observed is the relationship between the two variables described above and the impact on socioeconomic status, which was divided into two categories according to the federal definition of poverty or lack of poverty. These results relate to the hypothesis of a positive relationship between cognitive and language skills. In this case, a significant and a positive correlation were observed, showing another slight difference between them. However, it is crucial to consider the discrepancy between the percentages of children in each category because it can lead to important conclusions. The conclusion will be discussed in the following paragraphs.

The third result showed whether poverty can predict language development delays in both groups. This study shows a significant relationship between these two variables with a moderate influence, which means the hypothesis was confirmed.

Apart from these three fundamental discussions, some topics reflected in the results have an intrinsic relationship with the theoretical foundation of this research. Among the topics to be discussed is the study of protective factors, executive functions, age of language acquisition, brain development, and biological and environmental factors, which will be developed below.

Discussion of Findings

According to the previous brief description of the results, this part was developed by comparing the results with the information presented previously. In other words, the main objective of this chapter is to discuss the theoretical and pragmatic meaning of the present study based on the three research questions.

RQ1: What is the correlation between language (expressive and receptive) and cognitive skills in children (18-36 months) from bilingual and monolingual family contexts based on the scores of DAYC2 (eligibility tool used in early intervention services)?

As described, the correlation between language and cognition is relatively intrinsic for both participant groups, supporting the theoretical basis. Cognitive skills, switching skills, and working memory, among others, can be mentioned since previous studies have shown that these skills have a preponderant role in language development, mainly in learning two languages. Javan and Ghonsooly (2018) pointed out a bidirectional relationship between bilingualism and executive function skills, where

bilingualism promotes cognitive skills and language learning while supporting better performance in future learning. Also, Arredondo et al. (2017) pointed out the influence of bilingualism on skills such as shifting and attention skills of focusing on the correct language and shifting attention by ignoring distractions.

The theoretical framework used for this research presented two positions regarding the cognitive advantage in executive functions. It was stated that children exposed to two languages may have cognitive advantages compared to children exposed to only one language at home. However, it cannot be ignored that other studies stated the opposite, totally or partially, denying the cognitive advantage. These two perspectives are in line with the statements presented in previous studies, such as Javan and Ghonsooly (2018) or Incera and McLennan (2018), who attribute the advantage of bilingual to the interaction that must have between a large number of demands handling both languages Gunnerud et al. (2020), also stated, that a bilingual person keeps the two languages activated and interacting. However, there are other studies that also point out disadvantages, such as Quiterios and Bates (2018) or Secer (2021), who pointed to studies where the bilingualism advantage is not observed in a significant way due to bias or absence of control of confounding variables such as socioeconomic status, ethnicity, or linguistic factors. This last statement prepares the way for discussing the second research question. In the end, the findings of this research supported the theoretical claim of the relationship between language and cognitive development. However, the existence or absence of cognitive advantages is a topic that will be discussed later.

RQ 2: What is the correlation between socio-economic status (poverty/non-poverty) and language and cognitive skills in children (18-36 months) from bilingual and

monolingual family contexts based on the scores of DAYC2 (eligibility tool used in early intervention services)?

It was observed that there was a positive and significant influence between language and cognitive skills of each group of participants, but not between them; however, a third variable allows changing the perspective of the results, which is the condition or level of poverty. Observing the similarity of the results of both groups in terms of scores obtained on language development and cognitive development, as well as the similarity in the levels of correlation of both variables (only a subtle difference), but at the same time, observing a significant difference in the number of participants identified below the poverty level, a new conclusion emerges. Since poverty has a moderate and predictive influence on delays in language development, a more significant difference should be expected between the group with the highest number of participants in poverty and the group with the lowest number of participants in poverty. However, both groups (bilinguals and monolinguals) have very similar results, even though more than 90% of bilingual children live in poverty. This research presented a discrepancy of more than 30% between children monolingual in poverty and the group of bilingual children coming from households classified according to federal guidelines as families with a background of poverty.

Based on the above results, two types of speculative conclusions are presented:

First, possible influences impact the degree of proficiency in the second language and the general development of the language. Among these influences are the non-linguistic ones presented by Francot et al., 2020 and even by Bronferbrenner, who discussed context's effect on the person, including socioeconomic background (Merçon-

Vargas et al., 2020). It is necessary to remember that it is widespread to find statements about the close relationship between the socioeconomic status of the family and immigration because, in one way or another, immigration is what has driven families and individuals to leave their homeland and move to unknown lands, often with another language and with another culture. This whole process is called globalization since immigration is not exclusive to the United States but is global. Garcia et al. (2018) pointed out that there is a visible increment of Latino/Hispanic children in the U.S. population. Thomas-Sunneson et al. (2018) reported that 25% to 50% of Hispanic school-aged children attend schools in some states, and most have Spanish as their home language. Socioeconomic status, as well as culture, are crucial influences in development. Quinteros & Bates (2017) agreed with the statement, pointing out that the cultural effects of bilingualism are vast, and many factors influence the acquisition process (Quinteros & Bates, 2017).

The second speculative conclusion is related to the possibility of participating in protective factors that cushion the effect of poverty and other adversities. So, analyzing the three variables, the conclusion that springs up is that there must be a factor that is buffering the language development of bilingual young children in poverty, not enough to avoid being classified in the category of delay, but enough to reach a very similar level to children who come from monolingual in no poverty contexts.

In addition to the previous conclusion, socioeconomic status (poverty) can also be considered a predictive factor of language development, a statement linked to the third research question.

RQ 3: May bilingualism and poverty at an early age predict language delays in children (18-36 months)?

According to the results observed above, it is important to point out that bilingualism, and mainly the socioeconomic aspect, impacts language and cognitive development and is a predictive factor of developmental delays. Gatt and O'Toole (2017) presented conclusions about how socioeconomic status predicts the type and amount of vocabulary parents use with children, which in turn impacts the child's language development, that is, a low socioeconomic level tends to use more limited vocabularies. Therefore, smaller vocabulary sizes may be considered a risk factor for delayed language development, children from families of low socio-economic status are very commonly identified as children experiencing a level of low ability in managing one of the two languages (Francot et al., 2020). In addition, the opposite side of this situation is pointed out by Hartanto et al. (2019) when they explained that children of high socioeconomic status are provided with more enriching materials and social interactions.

After looking at the theoretical underpinnings that relate directly to each research question, five concepts are openly visible in this study and broadly supported in its theoretical context.

Bilingualism and brain development: The literature review presented information on how childhood experiences overtly influence brain development; these external influences produce internal changes, and although the cognitive advantage is difficult to observe, it is impossible to deny the relationship between language skills and physiological changes in the brain. According to previous research, simultaneous children, i.e., those who learn both languages simultaneously through interaction with

their family and environment, have brain wiring different from sequential children, called primary bilinguals. Goksan et al. (2021) stated that the relationship between language acquisition and brain development in early life experiences is easy to observe, and Gunnerud et al. (2020) explained how bilingualism impacts the brain during the entire life, with a larger effect in early childhood due to neuroplasticity. The findings of the present study demonstrated consistently a significant relationship between bilingualism and cognitive skills.

Protective factors: Regarding protective factors, the literature presents this topic as a group of elements functioning as buffers that limit the negative effect of circumstances affecting the child's development. Unfavorable circumstances include adverse experiences, scarcity of resources, traumatic situations, etc. In the case of this research, poverty and, in many cases, immigration. Among the conclusions obtained by this research, it was pointed out, speculatively, that bilingual children may have protective factors helping them cushion the "moderate" effect of poverty on language development. Araujo et al. (2020) stated that protective factors benefit language acquisition, a statement also supported by Short et al. (2019), who pointed out a direct influence of protective factors over language development, family and community support, early childhood education, social-emotional skills, and spirituality, (Fitzgerald & Berthiaume, 2022) which, although it is not analyzed, is mentioned in the approach provided by Urie Bronfenbrenner's bioecological theory (Merçon-Vargas et al., 2020).

Ecological theory: Applying the bioecological theory presented by Urie Bronfenbrenner, the concept of proximal processes, like "the machines of development," can be observed. As previously mentioned how, this theory presents four proximal

processes, including genetic transmission, the impact of physiological and psychological changes during early childhood, relationships-attitudes-interpersonal interactions between the child and the family, and the effects of the immediate physical environment, which includes the school, community, and place of worship. These four processes include both biological and external environmental factors that influence development. Bronfenbrenner's theory explains that there is no genetic code specifically for language (Merçon-Vargas et al., 2020). However, language development is composed of physiological elements that include brain development and neuroplasticity that in early childhood is rapid and consistent (as mentioned above), and the extraordinary influence that the environment and relationships with the family and the immediate context have where the house of worship is included, as it was observed throughout the results of this study.

This research has this theory as its fundamental axis, where the importance of early childhood is recognized, where the physiological part is respected (this is why only children with typical development were included at the time of evaluation for the NC IT Program), and the effect of the environment on the child (included as home language and socioeconomic status). In addition, it is essential to recognize how the interest in child development, prevention, and intervention in any developmental milestone has grown because is well known now the long-lasting effects of the first years of life into adulthood, so early childhood is a window of opportunity (in terms of neuroplasticity) to promote a healthy and balanced development.

Language acquisition: Another concept presented in the literature review that is predominant in this study is the importance of the age of language acquisition, or

languages in the case of bilingualism. According to what was previously presented, there are a series of concepts related to language acquisition, and the age of this acquisition is vital because it facilitates the child to have a good balance between receptive/expressive skills and culture (these statements pointed out the importance of the inclusion criteria of the participants for this research study). Therefore, having the opportunity to quantify the areas of development of children under three years of age using reliable, standardized tests provided a good foundation for this research (Makrodimitris & Schulz, 2021). Regarding the additional concepts proposed on language development, it can be stated that the participants of this research are in the category of simultaneous learning (two languages at the same time between what is spoken at home and what they learn from the environment, including the media and older siblings) and not in the sequential category. In addition, they are participants in primary learning (learning from experience) and not secondary (formal teaching), and the learning experience is integrated (both languages mixed) (Nguyen and Winsler, 2021).

In summary, the results obtained by this research openly contribute to the understanding of the theories presented in the literature review, starting with the concept of human development and pointing in the direction that early childhood is a vital point of this process, where an intrinsically significant relationship can be observed in the executive functions and language. In addition, the social aspect of development can also be integrated; the influence of the environment shaped the development, including the various levels of interaction, starting with the immediate (the family) and extending further and further out of the spectrum, but understanding that each level of interaction in one way or another exerts influence between them until it reaches the child.

The contributory importance of this research reaches early intervention programs and other programs dedicated to preventing and treating developmental delays and other programs that have direct contact with toddlers and promote literacy and verbal communication for young children. The results of this one and other research related to child development and its interaction with poverty levels are relevant for agencies that have direct contact with families living below the poverty level and also that relate to a large percentage of immigrant families. It should be noted that it is crucial to understand the close relationship between poverty and bilingualism in our immediate context since most families with bilingual backgrounds in the USA come from immigration motivated by even more extreme poverty, problems of insecurity, and lack of opportunities in their homeland.

Spirituality is a factor observed in the theoretical component of this research study but not in the practical one; despite being considered a protective factor in helping children face adversity (such as poverty and the adverse effects of immigration), it promotes healthy interaction between the adult and the child. Any effort that is made for children is amply supported by Scripture. The word of God shows how the human being is the crown of his creation so that the complexity and, at the same time, the complementarity of the areas of development can only be the work of God and a sign of his love for humankind. Scripture shows a God of love who cares for his children and promises to be there and accompany him amid any adversity. The disciples and Jesus endured challenging situations and found comfort and help-seeking God.

Implications

As discussed previously, the results of this research and any others that include young children as participants are very helpful in increasing the understanding of human development and the knowledge of how to prevent and treat developmental delays. Early intervention agencies, preschool programs, children's ministries, and families with young children, in general, can benefit from knowledge, identification, and treatment, understanding once again that this period of childhood is a critical period in development where there is a wide range of opportunities to foster the whole child's growth that impacts the rest of the person's life.

The existence of a significant correlation between cognitive skills and language offers the opportunity for the four groups mentioned above (Early intervention agencies, preschool programs, families, and children's ministries) to develop strategies focused on the promotion of executive functions such as working memory or switching skills, as well as strategies to promote receptive language (what is understood) and expressive language (what is said) of children between the ages of 18 to 36 months so that they can meet the standards proposed by the American Association of Pediatricians.

On the other hand, considering the proposed theoretical framework and the results of this research, the information can help develop treatment plans for children who are developmentally delayed. Both implications must be developed with cultural sensitivity toward children from homes where they hear a second language other than English.

In addition, it is important to point out that the number of children exposed to a second language has increased by leaps and bounds in recent decades, as this is a global phenomenon. Increasingly, classrooms, schools, and other services are faced with the dilemma of dealing with children from different cultural backgrounds and with a two-

language communication system. The information and results of this research present the opportunity to raise awareness of the physiological, psychological, and even cultural differences that children who come from bilingual backgrounds may have.

It is important for agencies working with children under three to develop a special cultural sensitivity. They should seek resources to provide reliable language interpretation, offer professional development opportunities to their culturally diverse staff, and prepare written documentation in the home language so that families and children feel respected and valued.

In addition to what has already been described above, it is necessary to observe the socioeconomic aspect of the research since this point was fundamental for interpreting the results obtained. It can be said that we live in times where the global economic problems fueled by wars, and even by the pandemic of recent years, have increased the level of poverty of the population for both foreigners and natives of each country. Poverty leads to a shortage of resources, including time, since parents are exposed to long working hours to cover economic expenses.

Therefore, it is necessary for organizations working with young children to seek financial resources to provide age-appropriate materials, play opportunities, and toys. In addition to what has already been described above, it is necessary to observe the socioeconomic aspect of the research since this point was fundamental for interpreting the results obtained. It can be said that we live in times where the global economic problems fueled by wars, and even by the pandemic of recent years, have increased the level of poverty of the population for both foreigners and natives of each country. Poverty leads to a shortage of resources, including time, since parents are exposed to long

working hours to cover economic expenses. Therefore, it is necessary for organizations working with young children to seek financial resources to provide age-appropriate materials, play opportunities, toys, and instructional equipment, and a repertoire of stimulating and developmentally appropriate activities. Among the resources, it is important to add didactic material for both the child and the adult, where you can find help, inspirational ideas, and materials for a practical evidence base. In addition to what has already been described, it is necessary to observe the socioeconomic aspect of the research since this point was fundamental for interpreting the results obtained. It can be said that we live in times where the global economic problems fueled by wars, and even by the pandemic of recent years, have increased the level of poverty of the population for both foreigners and natives of each country. Poverty leads to a shortage of resources, including time, since parents are exposed to long working hours to cover economic expenses.

In summary, the results and the information provided by this research can be applied to any educational, medical, and spiritual institutions or groups, including families, that could work directly with early childhood children. Acknowledging the relationship between the three variables of this research may lead to the development of appropriate tools for evaluation, treatment, follow-up, coaching, or support promoting a healthy and integral person.

Limitations

Four *limitations* were already mentioned as part of this research study. The *first* one refers to the recruitment process of participants because to be included in this research study, children should be participants of the North Carolina Early Intervention

program; children who have not been referred to the program will not be evaluated and cannot provide information. Therefore, there is a limitation to reaching them. The *second* is about the instruments for collecting data, which are efficient and evidence-based but limited to only two instruments. Since the ITP conducts the evaluation, there is a limitation to the integration of other measurement tools. *Third*, social development observation is limited to socioeconomic status and bilingualism, which is positive since they are quantifiable variables. However, at the same time, they are only a tiny sample of the variety of social elements that may interact with child development. Finally, there is a limitation related to the replication of the study, indicating that the person interested in repeating this study must know in advance about the system used by early intervention programs and possibly understand the processes of child development. Finally, there is a limitation related to the replication of the study, indicating that the person who is interested in repeating this study must know in advance about the system used by early intervention programs and possibly understand the processes of child development.

After completing the research, three additional limitations can be mentioned, adding up to seven. The *fifth* limitation is related to the disparity between the group of participants under the criterion of being above the poverty line and over the poverty line in the group of bilingual children. On the one hand, a high percentage of children from a background of poverty offered ample and rich information. However, the number of participants was greatly limited to bilingual children who were not living in poverty.

The *sixth* limitation was related to the home language because just a few children in the bilingual group spoke a language other than Spanish. However, it is essential to

note that the presence of these few participants offered a little more variety and expanded the external validity.

A *seventh* and last limitation observed, which also provides its positive and negative sides, is that due to the differences in the documentation process in the myAvatar program, some agencies display the results more descriptively than others and go on the safe side, the participants could be taken only from a single agency; however, on the positive side, the agency who provided data is one of the most substantial and most prominent in the state, and her catchment area include six counties.

Recommendations for Future Research

Several recommendations can be taken for future research: First, expanding the range of languages is beneficial, which will benefit the study's external validity. Second, the coverage of the participants should be extended to other counties or states to help provide more generalization. Third, the family's culture should be respected by giving paperwork, materials, and information in their home language and showing cultural competency. Fourth, other social components besides poverty and different types of adversity should be included. Fifth, the cultural context of the participants should be observed more closely. Sixth, further research should focus on the executive functions of bilingual children. Seven would be highly recommended to determine more buffers influencing language development, including spirituality.

Summary

This chapter concludes with the discussion and application of the results found through this research. Significant positive relationships have been observed in the variables, and, above all, the simultaneous inclusion of a third variable allowed the

conclusion and discussion to be directed in another direction since, without the integration of the socioeconomic element, the result could be interpreted very differently.

What can be taken from this research study? This research supports the growing interest in human development from the point of view of early childhood, a more precise awareness of the predominant role of language development and cognitive skills, a desire to continue to grow in cultural sensitivity, and one of the most critical points is to continue striving to integrate spirituality as a predominantly important area in the concept of personal development. At the end of the day, bilingualism may not be demonstrated clearly as a missed opportunity, but it can be speculated that it may be acting as a camouflage element, a confounding variable, playing a crucial role in language and cognitive development in early childhood, with repercussions that go a long way in human development

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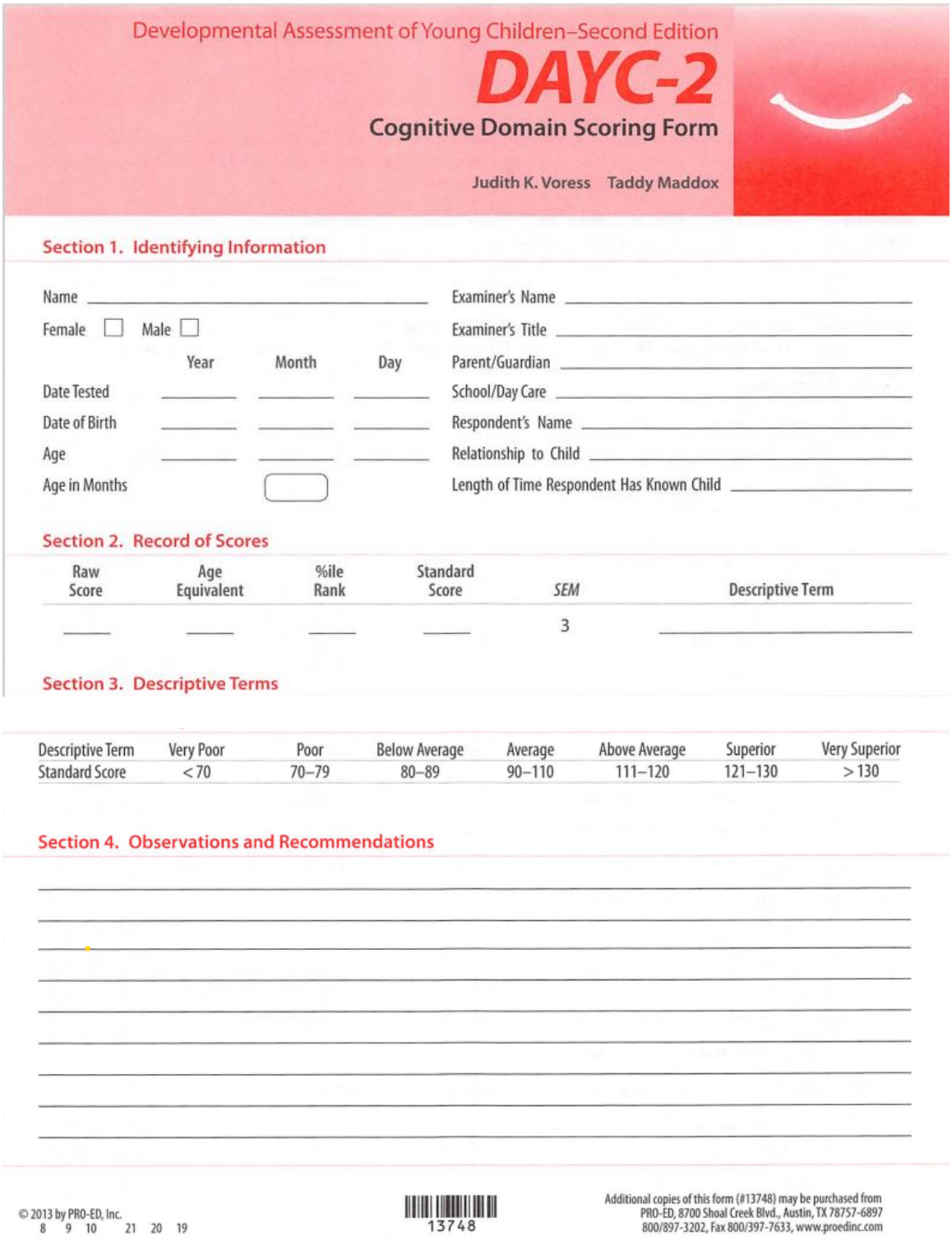
APPENDIX A: DEVELOPMENTAL ASSESSMENT OF YOUNG CHILDREN

(DAYC 2) COGNITIVE DEVELOPMENT SCALE



Developmental Assessment of Young Children–Second Edition

DAYC-2

Cognitive Domain Scoring Form

Judith K. Voress Taddy Maddox

Section 1. Identifying Information

Name _____

Female ☐ Male ☐

	Year	Month	Day
Date Tested			
Date of Birth			
Age			
Age in Months			

Examiner's Name _____

Examiner's Title _____

Parent/Guardian _____

School/Day Care _____

Respondent's Name _____

Relationship to Child _____

Length of Time Respondent Has Known Child _____

Section 2. Record of Scores

Raw Score	Age Equivalent	%ile Rank	Standard Score	*SEM*	Descriptive Term
				3	

Section 3. Descriptive Terms

Descriptive Term	Very Poor	Poor	Below Average	Average	Above Average	Superior	Very Superior
Standard Score	< 70	70–79	80–89	90–110	111–120	121–130	> 130

Section 4. Observations and Recommendations

Section 5. Record of Performance

Cognitive Domain

Instructions: Starting points are determined by the child's age. Score 1 if the child does exhibit the behavior described most of the time, or did when he or she was younger but has outgrown the behavior. Score 0 if the child does not exhibit the behavior described or exhibits the behavior inconsistently.

Basal and Ceiling: Begin at the starting point. Administer items until three consecutive items receive a score of 0 (i.e., to establish a ceiling). If the child receives a score of 0 on any of the first three items, test backward until the child scores a 1 on three items in a row (i.e., to establish a basal). If the child does not receive a score of 0 on three consecutive items while establishing a basal, return to highest item number scored and continue testing until a ceiling is established.

***Entry Points:** Birth–11 months: **Item 1** | 12–23 months: **Item 19** | 24–35 months: **Item 29** | 36–47 months: **Item 40** | 48–59 months: **Item 53** | 60 months and older: **Item 65**

Item #	Score (1 or 0)	Item
*1.		turns head or moves eyes to visually explore surroundings
2.		moves hand to mouth
3.		looks at object for at least 3 seconds
4.		watches an object moved slowly through his or her line of sight
5.		looks back and forth between two objects
6.		inspects own hands
7.		holds toy placed in hand for 10 to 15 seconds
8.		mouths toys
9.		alternatively glances from hand to an object or from one hand to another
10.		repeats arm or leg movements to cause an action to occur again (e.g., shakes arm with rattle attached to wrist, kicks legs to move mobile attached to crib)
11.		gaze lingers where object moved slowly through line of sight disappears from view
12.		explores objects in a variety of ways (e.g., visually, turning it around, feeling all surfaces, banging and shaking)
13.		follows path of fast-moving object
14.		pulls cloth from face
15.		intentionally drops an object and watches it fall (e.g., drops spoon from high-chair tray and watches it fall)
16.		imitates familiar action after observing caregiver doing that action (e.g., claps hands)
17.		finds an object that is partially hidden
18.		transfers an object from one hand to the other to pick up second object
*19.		retrieves an object seen hidden under or behind a single barrier
20.		touches adult to have that person start or continue interesting game or action

*Entry Points:		Birth–11 months: **Item 1** 12–23 months: **Item 19**	24–35 months: **Item 29** 36–47 months: **Item 40**	48–59 months: **Item 53** 60 months and older: **Item 65**

Item #	Score (1 or 0)	Item
21.		looks at pictures in a book (may pat or point to the pictures)
22.		rolls wheeled toys
23.		hands an object to an adult to have that person repeat or start a desired action (e.g., start windup toy)
24.		attempts to start toy if he or she has seen someone else make it work (e.g., a windup toy)
25.		places a small object into small container (e.g., a raisin into a small bottle)
26.		imitates scribbling
27.		demonstrates appropriate use of everyday items (e.g., pretends to drink from a cup, sweeps with a broom)
28.		combines two related objects during play (e.g., bowl and spoon, brush to doll's hair)
*29.		looks at picture book with adult, may name or point to simple objects
30.		manages three to four toys by setting one aside when given a new toy
31.		spontaneously names five or more objects
32.		stacks six to seven blocks
33.		imitates activities using substitute object to represent real one (e.g., stick for spoon, washcloth for doll blanket)
34.		matches five or more objects to a corresponding picture
35.		sequences related action in play involving two to three steps (e.g., feeds doll with bottle, then pats it on the back, then puts doll to bed)
36.		repeats finger plays with words and actions
37.		tells own age (may state or hold up appropriate number of fingers)
38.		understands concepts of "one" (e.g., "Give me one block."), "one more" (e.g., "Give me one more."), and "all" (e.g., "Give me all the blocks.")
39.		matches circle, square, and triangle
*40.		puts graduated sizes in order (e.g., nests four boxes or stacks rings on peg in order of size)
41.		states accurately whether boy or girl
42.		counts by rote to five
43.		counts up to five objects
44.		builds bridge using three blocks (adult models) 
45.		matches objects by color, shape, and size
46.		tells if objects are "heavy" or "light"
47.		understands concepts of "same" and "different" (e.g., "Are these two colors the same?")

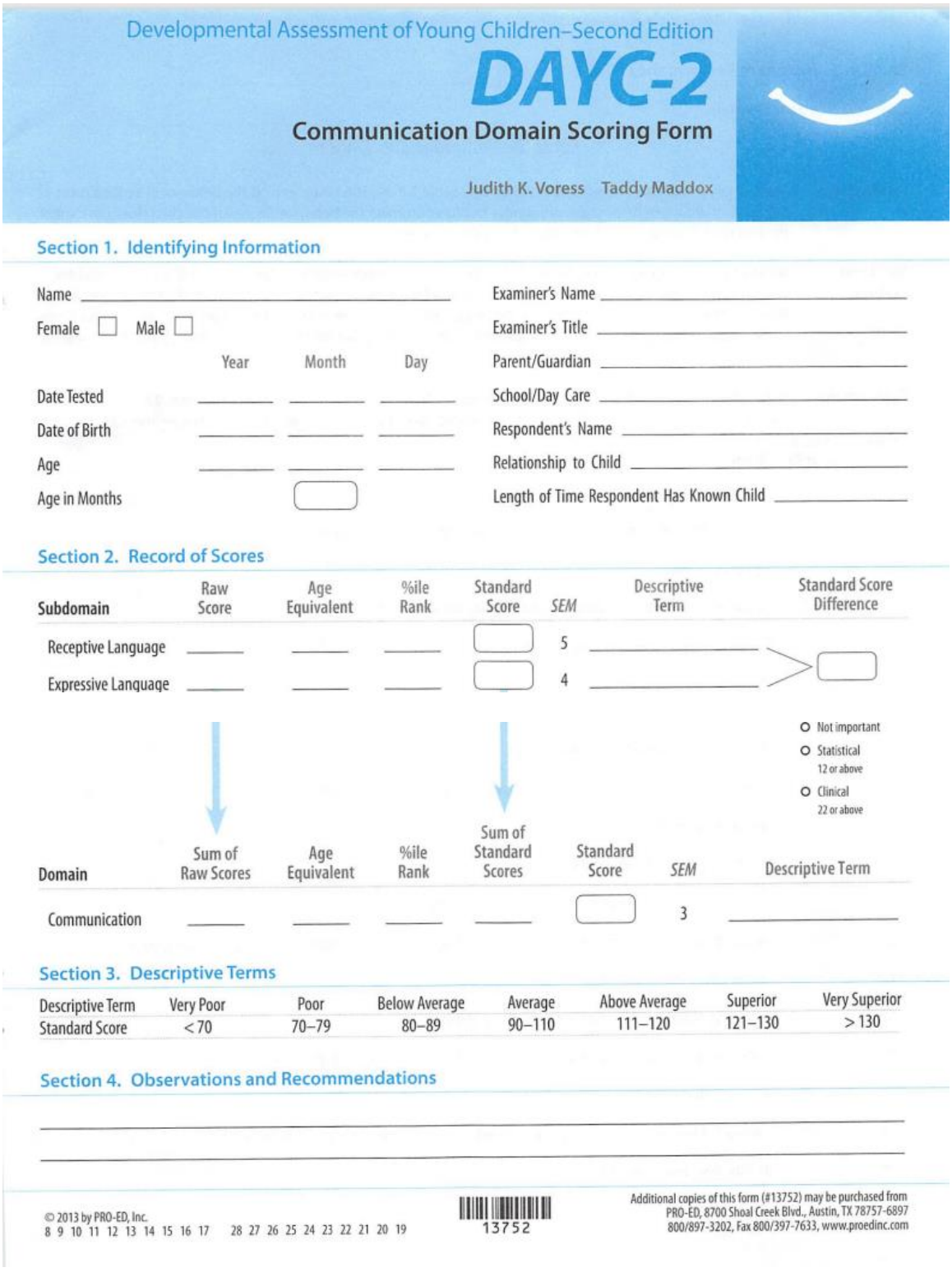
*Entry Points: Birth–11 months: **Item 1** | 12–23 months: **Item 19** | 24–35 months: **Item 29** | 36–47 months: **Item 40** | 48–59 months: **Item 53** | 60 months and older: **Item 65**

Item #	Score (1 or 0)	Item
48.		matches three pairs of objects that have the same function (e.g., comb and brush, bowl and plate)
49.		understands "more" and "less" (e.g., "Which pile has more?")
50.		understands concept of "three" (e.g., "Give me three blocks.")
51.		sorts objects by physical characteristics (Give child three or more pictures or objects across at least two variables, e.g., shape or color, and state, "Put these into groups that are alike.")
52.		sorts objects into categories (Give child three or more pictures or objects for at least two categories, e.g., toys or animals, and state, "Put these into groups that are alike."); may not be able to label the categories
*53.		identifies objects that do not belong in a group (e.g., recognizes that dog does not belong with food items) for three or more object sets
54.		imitates drawing of a face with at least three features
55.		retells story from picture book with reasonable accuracy
56.		builds pyramid of six blocks (adult models) 
57.		draws people, may be stick figures
58.		copies own name; may use large, irregular letters
59.		predicts what may happen next (e.g., ask child what may happen next in a story)
60.		identifies "first," "last," and "middle" (e.g., "Point to the child who is first in line.")
61.		knows sequence of reading a book from left to right, top to bottom
62.		distinguishes between real and make-believe and living and nonliving (e.g., "Is the truck alive?" "Show me which of these things are make-believe.")
63.		understands concept of "zero" (e.g., "Which cup has zero cubes?")
64.		identifies "half" and "whole" objects
*65.		names 20 or more letters
66.		draws person with six recognizable parts
67.		prints first name legibly without a model
68.		identifies the larger of two numbers for three or more number sets (e.g., "Which is more, 2 or 3?" "Which is more, 8 or 6?")
69.		matches the number of items in a set to the correct numeral for three or more sets; does not need to state numeral
70.		sorts groups of objects in more than one way (Give child pictures or objects across at least two categories, e.g., color, size, or shape, and state, "Put these into groups that are alike. Now sort them in another way.")
71.		puts three pictures in a sequence to tell a story
72.		counts up to 20 objects
73.		draws five or more identifiable objects without a model
74.		arranges numbered tiles or cards (1–10) in sequenced order at least two times

*Entry Points:	Birth–11 months: **Item 1**	24–35 months: **Item 29**	48–59 months: **Item 53**
	12–23 months: **Item 19**	36–47 months: **Item 40**	60 months and older: **Item 65**

Item #	Score (1 or 0)	Item
75.		consistently tells month and day of birth
76.		names the days of the week in order
77.		writes first and last name from memory
78.		consistently tells own street name and town
79.		for numbers 1 through 30, can state the preceding and following numbers for three numbers (e.g., "What number comes before 19?" "What number comes after 19?")
80.		can state use of at least three body parts (e.g., "What do you do with your . . . eyes, nose, ears?")
81.		reads 10 or more printed words
82.		names the months of the year
83.		writes numerals 1 to 19 without model
84.		counts by rote from 1 to 100
85.		calculates five or more single-digit addition problems
86.		calculates five or more single-digit subtraction problems
87.		writes name, address, and phone number
88.		measures length to the inch and half inch using ruler
		TOTAL DOMAIN RAW SCORE

APPENDIX B: DEVELOPMENTAL ASSESSMENT OF YOUNG CHILDREN (DAYC 2) LANGUAGE DEVELOPMENT SCALE



Developmental Assessment of Young Children–Second Edition

DAYC-2

Communication Domain Scoring Form

Judith K. Voress Taddy Maddox

Section 1. Identifying Information

Name _____

Female ☐ Male ☐

	Year	Month	Day
Date Tested			
Date of Birth			
Age			
Age in Months		☐	

Examiner's Name _____

Examiner's Title _____

Parent/Guardian _____

School/Day Care _____

Respondent's Name _____

Relationship to Child _____

Length of Time Respondent Has Known Child _____

Section 2. Record of Scores

Subdomain	Raw Score	Age Equivalent	%ile Rank	Standard Score	*SEM*	Descriptive Term	Standard Score Difference
Receptive Language				☐	5		
Expressive Language				☐	4		☐

○ Not important
○ Statistical 12 or above
○ Clinical 22 or above

Domain	Sum of Raw Scores	Age Equivalent	%ile Rank	Sum of Standard Scores	Standard Score	*SEM*	Descriptive Term
Communication					☐	3	

Section 3. Descriptive Terms

Descriptive Term	Very Poor	Poor	Below Average	Average	Above Average	Superior	Very Superior
Standard Score	< 70	70–79	80–89	90–110	111–120	121–130	> 130

Section 4. Observations and Recommendations

_____

_____

8 9 10 11 12 13 14 15 16 17 28 27 26 25 24 23 22 21 20 19

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Additional copies of this form (#13752) may be purchased from PRO-ED, 8700 Shoal Creek Blvd., Austin, TX 78757-6897 800/897-3202, Fax 800/397-7633, www.proedinc.com

Section 5. Record of Performance

Communication Domain

Receptive Language Subdomain

Instructions: Starting points are determined by the child's age. Score 1 if the child does exhibit the behavior described most of the time, or did when he or she was younger but has outgrown the behavior. Score 0 if the child does not exhibit the behavior described or exhibits the behavior inconsistently.

Basal and Ceiling: Begin at the starting point. Administer items until three consecutive items receive a score of 0 (i.e., to establish a ceiling). If the child receives a score of 0 on any of the first three items, test backward until the child scores a 1 on three items in a row (i.e., to establish a basal). If the child does not receive a score of 0 on three consecutive items while establishing a basal, return to highest item number scored and continue testing until a ceiling is established.

*Entry Points:	Birth–11 months: **Item 1**	24–35 months: **Item 16**	48–59 months: **Item 27**
	12–23 months: **Item 8**	36–47 months: **Item 23**	60 months and older: **Item 31**

Item #	Score (1 or 0)	Item
*1.		normal breathing rate
2.		reacts to loud noise by blinking, moving arms or legs, or stopping movement
3.		quieted by music
4.		turns head toward voice when someone speaks to him or her
5.		smiles at person who is talking or gesturing
6.		turns and looks toward noise
7.		briefly stops activity when name is called
*8.		responds with appropriate gestures to "up," "bye-bye," or other routines
9.		moves body to music
10.		briefly stops activity when told "no"
11.		follows simple spoken commands (e.g., "Give Mommy the cup.")
12.		responds to "where" questions (e.g., "Where is the ball?" May point, state the location, or go get the ball.)
13.		when asked, will point to five or more familiar persons, animals, or toys
14.		follows directions about placing one item "in" and "on" another
15.		indicates "yes" or "no" (or appropriate head movement) in response to questions
*16.		points to three body parts when asked
17.		carries out two-step directions that are related (e.g., "Go to the table and bring me the toy.")
18.		points to six body parts when asked

*Entry Points:		Birth–11 months: **Item 1** 12–23 months: **Item 8**	24–35 months: **Item 16** 36–47 months: **Item 23**	48–59 months: **Item 27** 60 months and older: **Item 31**

Item #	Score (1 or 0)	Item
19.		points to 15 or more pictures of common objects when they are named
20.		understands at least three possessives (e.g., mine, yours, and boy's; "Is this your ball?" "Show me the dog's food.")
21.		points to five or more common objects described by their use (e.g., "Show me what you eat with.")
22.		carries out two-step unrelated commands (e.g., "Put the ball on the shelf and then clap your hands.")
*23.		understands negative (e.g., "Which is not . . . red, the dog?")
24.		knows "big" and "little" (e.g., "Throw the big ball to me.")
25.		responds to "who" and "whose" questions (e.g., "Who has on a red shirt today?")
26.		follows directions about placing one item "beside" and "under" another
*27.		understands "in front of" and "behind" (e.g., "What is behind the screen?")
28.		answers comprehension questions when told a short story
29.		demonstrates understanding of passive sentences (e.g., "Show me the train was pushed by the car.")
30.		carries out three-step commands that are not related (e.g., "Put the ball on the table, shut the door, and turn around.")
*31.		tells whether two words rhyme or have the same ending sound for at least three word pairs (e.g., "Do *cat* and *pat* have the same ending sound?")
32.		responds to questions involving time concepts (e.g., "When do we eat lunch?")
33.		understands all four seasons of the year and what you do in each (e.g., "What do we do in the summer?")
34.		can identify at least three opposites using pictures or objects ("Show me the opposite of . . . big/little, hot/cold, tall/short.")
35.		identifies "left" and "right" on own body (e.g., "Raise your right hand.")
36.		can identify at least three units of currency (e.g., "Point to the . . . penny, dollar, quarter")
37.		can identify at least three complete sentences ("Tell me if this is a complete sentence." e.g., brown dog; The boy ran away.)

RECEPTIVE LANGUAGE SUBDOMAIN RAW SCORE

Continues with
Expressive Language →

Expressive Language Subdomain

Instructions: Starting points are determined by the child's age. Score 1 if the child does exhibit the behavior described most of the time, or did when he or she was younger but has outgrown the behavior. Score 0 if the child does not exhibit the behavior described or exhibits the behavior inconsistently.

Basal and Ceiling: Begin at the starting point. Administer items until three consecutive items receive a score of 0 (i.e., to establish a ceiling). If the child receives a score of 0 on any of the first three items, test backward until the child scores a 1 on three items in a row (i.e., to establish a basal). If the child does not receive a score of 0 on three consecutive items while establishing a basal, return to highest item number scored and continue testing until a ceiling is established.

*Entry Points:	Birth–11 months: **Item 1**	24–35 months: **Item 16**	48–59 months: **Item 30**
	12–23 months: **Item 8**	36–47 months: **Item 24**	60 months and older: **Item 34**

Item #	Score (1 or 0)	Item
*1.		has a strong cry
2.		makes sucking noises
3.		cries when hungry or uncomfortable
4.		makes noises other than crying (e.g., cooing, gurgling)
5.		has different cries for pain, hunger, or discomfort
6.		produces three or more single vowel sounds (e.g., ah, eh, uh)
7.		laughs out loud
*8.		produces three or more consonants, such as /b/, /m/, or /d/
9.		produces string of consonant–vowel sounds (e.g., ba-ba, da-da)
10.		uses word for parent or caregiver discriminately (e.g., mama, dada, nana)
11.		uses inflection patterns when vocalizing (e.g., raises pitch as if asking a question)
12.		spontaneously says familiar greetings and farewells
13.		has a word, sound, or sign for "drink"
14.		uses at least five words
15.		says one word that conveys entire thought; meaning depends on context (e.g., "cookie" may mean "wants more" or "the cookie fell")
*16.		can name familiar characters or items seen on TV or in movies (e.g., Big Bird)
17.		knows names of two or more playmates
18.		uses 10 to 15 words spontaneously
19.		produces three or more two-word phrases (e.g., more juice)

*Entry Points:		Birth–11 months: **Item 1** 12–23 months: **Item 8**	24–35 months: **Item 16** 36–47 months: **Item 24**	48–59 months: **Item 30** 60 months and older: **Item 34**

Item #	Score (1 or 0)	Item
20.		names eight or more pictures of familiar objects
21.		whispers
22.		uses sentences of three or more words
23.		uses at least 50 different words in spontaneous speech
*24.		describes what he or she is doing (e.g., responds to "What are you doing?")
25.		asks "what" or "where" questions (e.g., "Where is my ball?")
26.		uses five or more regular plurals (e.g., boys, toys)
27.		changes speech depending on listener (e.g., talks differently to babies than to adults)
28.		gives full name on request (e.g., "What is your name?")
29.		answers question, "What happens if . . ." (e.g., " . . . you drop an egg.")
*30.		uses five or more contractions (e.g., I'll, can't)
31.		uses facial expressions and body language to demonstrate at least five emotions (e.g., "Show me how you would look if you were . . . angry, proud, frightened, scared.")
32.		makes statements about cause and effect (e.g., "It won't roll because the wheel is off.")
33.		defines five simple words (e.g., "What is a *car*?")
*34.		completes at least three simple verbal analogies (e.g., "Daddy is a man; Mommy is a _____.")
35.		states similarities between objects for at least three object pairs (e.g., "How are shoes and boots alike?")
36.		responds to "Tell me the opposite of _____" for at least three words
37.		uses irregular plurals correctly (e.g., foot/feet, goose/geese)
38.		tells simple jokes
39.		states differences between objects for at least three object pairs (e.g., "How are milk and water different?")
40.		uses "yesterday" and "tomorrow" meaningfully
41.		uses irregular comparatives correctly (e.g., good, better, best)
		EXPRESSIVE LANGUAGE SUBDOMAIN RAW SCORE