

Teachers' beliefs in critical period and language instructional practices

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Abstract

The study quantitatively and qualitatively investigated both preservice and in-service teachers' beliefs and understandings on critical period for language development and their language instructional practices. The results of the study showed that most participants believed in the existence of a critical period for language acquisition and the importance of understanding the concept of critical period to facilitate English Language Learners (ELLs) for language learning. However, participants also believed that using translation or an ELL's L1 for language instruction could most benefit ELLs from English learning. The two beliefs are carefully analyzed and discussed in the study with a comparison to existing language research and literature. Insights are therefore provided for teacher education programs for education renovations and preparations.

Keywords teachers' belief, critical period, language instruction

1. Introduction

There is a critical period for every area of human development, such as physical, cognitive, emotional, and language development. A great deal of research has evidenced the existence of critical period. According to neuroscience, a critical period is a prime time where neurons are most interactive and receptive to environmental stimuli. A critical period is defined as "a period of time in which intercellular communication alters a cell's fate" (Bear et al., 2007, p. 715.). The concept of "critical period" is based on Hans Spemann's study on embryo transplantation. Hans Spemann received a Nobel Prize in 1935 based on the study. A critical period is sensitive and crucial, for it affects the development of language function (Crain, 2005) and determines language ultimate proficiency (Hartshorne, et al. 2018). Understanding the concept of critical period is pivotal because it guides educators how to apply age-appropriate materials and language teaching approaches to maximize language learning effects to receive language ultimate proficiency. Children and adults learn differently due to brain lateralization (Rice, 2002) associated with the critical period. The concept of critical period explains how brain maturation levels associated with ages affect the ability of acquiring a native-like accent and pronunciation (Acton, 1984; Lenneberg, 1967). The younger a learner is, the easier it is for the learner to acquire (pick up) or learn language through interactions with native speakers in the natural world. In other words, younger children's language acquisition/learning tends to be more unconscious, informal, and spontaneous without having to make efforts

to understand grammatical rules. On the contrary, the older a learner is, the more difficult it is for one to acquire or learn a language. In other words, older children's or adults' language acquisition/learning tends to be more conscious and requires more efforts to understand explicit and analytical explanations about the grammatical rules in a formal education setting, such as a classroom (Krashen, 1982).

Accordingly, educators' understanding and belief of how language works in terms of being equipped with professional pedagogical knowledge of critical concepts and principles about the English language has a significant impact on how they deliver their language instruction practice (i.e. differentiated instruction by applying different language teaching approaches) to meet the needs of diverse learners of different ages and education needs. The professional pedagogical knowledge of critical concepts and principles about the English language include but are not limited to understanding essential linguistics (technical knowledge in teaching language, such as phonological awareness, vocabulary, spelling, reading comprehension, and grammar) and the concept of the critical period where it plays a critical role in the process of language acquisition.

Additionally, due to the rapid demographic changes in the U.S., many school teachers and administrators have constantly faced and struggled in meeting the education needs of diverse students particularly those of ELLs. As a result, many ELLs have been overrepresented in special education disproportionality. For decades, research has repeatedly addressed the concern of literacy achievement gaps among students in the elementary and secondary education levels. For example, many studies have

indicated that children's early literacy skills are the predictors for their higher levels of reading comprehension skills and future academic achievement (Leahy & Fitzpatrick, 2017). Therefore, there is a need to understand current teachers' beliefs and understandings of how language works since it has a great impact on teachers' decisions and classroom practices (Amiryousefi, 2015; Nation & Macalister, 2010).

Hence, the purpose of this study was to investigate teachers' beliefs and understandings on the critical period for language learning and how their beliefs and understandings had an impact on their language instruction by using a mixed methods approach. The results of the study were carefully analyzed and discussed based on the collected quantitative and qualitative data with a comparison to the existing research and literature about critical period and language instruction. The ultimate goal was to provide insights for teacher education renovations and preparations with the anticipation that disproportionality issues and literacy achievement gaps would be one step further to be resolved and closed.

2. Theoretical Framework

There are many dramatic political and educational changes in the U.S. in the 21st century. Educationally, there are at least two significant challenges that the U.S. schools are encountering. First, due to the rapid demographic changes in the U.S., many school teachers and administrators have constantly faced and struggled in meeting the education needs of diverse students particularly those of ELLs. As a result, many ELLs have been overrepresented in special education disproportionality. Second, for decades, research has repeatedly addressed the concern of literacy achievement gaps among students in the elementary and secondary education levels. For example, Lee, et al. (2007) reported that more than one-third of the 4th graders in the U.S. cannot successfully complete the schoolwork due to low reading levels. Many studies have also indicated that children's early literacy skills are crucial. They are the predictors for future academic success. Castles, et al. (2018) added that getting children involved in reading early on can increase children's higher levels of reading comprehension skills and predict their future academic achievement (Leahy & Fitzpatrick, 2017). Children's language skills are obviously of the utmost importance and teachers' professional knowledge and instructional practices consequently become a crux in determining the outcomes of children's language learning. However, teachers' instructional practices are frequently influenced according to their beliefs derived from their knowledge, experience, culture, and understanding. Accordingly, classroom teachers do need to have sufficient conscious technical knowledge of the English language and clinical experience, so learners can be well instructed to acquire language skills. In addition, parents (home teachers) can be well coordinated with classroom teachers.

Theory guides practice and practice informs theory. The purpose of the study was to investigate teachers' beliefs and understandings on the critical period for

language learning and how their beliefs and understandings played a role in affecting their language instruction. In order to achieve the purpose of the study, the following important topics are briefly reviewed: 2.1 Teachers' Beliefs and Instructional Practices, 2.2 Critical Period of Language Development, and 2.3 Language Instructional Practices. There is a main focus and theory behind each teaching approach. No teaching approach is the best and should be considered as a cure-all prescription. The rule of thumb is to understand the purpose, theory/rationale, and language skills sought for each teaching approach and learn how to implement it effectively to meet a child's education needs. Therefore, under 2.3 Language Instructional Practices, six well-known popular language teaching approaches will be briefly presented here as examples including Translanguaging, which receives most recent popularity. If teachers do not have sufficient knowledge and experience about any teaching approach, teachers may not choose to use it or implement it appropriately to bring out the best teaching and learning impacts in considering a learner's age and learning needs. These six language teaching approaches are Audiolingual Method (AM), Communicative Language Teaching (CLT), Phonics, Whole Language, Translation, and Translanguaging. These teaching approaches are only used in this paper as examples to illustrate the key concepts about language teaching and learning effectiveness. The key concepts are language theory/rationale related to age, unconscious vs. conscious learning, and skills sought, such as language learning purposes, and form (linguistic/grammatical competence) vs. content (meaning/communication).

2.1. Teachers' Beliefs and Instructional Practices

There are many dramatic political and educational changes in the U.S. in the 21st century. Educationally, there are at least two significant challenges that the U.S. schools are encountering. First, due to the rapid demographic changes in the U.S., many school teachers and administrators have constantly faced and struggled in meeting the education needs of diverse students particularly those of ELLs. As a result, many ELLs have been overrepresented in special education disproportionality. Second, for decades, research has repeatedly addressed the concern of literacy achievement gaps among students in the elementary and secondary education levels. For example, Lee, et al. (2007) reported that more than one-third of the 4th graders in the U.S. cannot successfully complete the schoolwork due to low reading levels. Many studies have also indicated that children's early literacy skills are crucial. They are the predictors for future academic success. Castles, et al. (2018) added that getting children involved in reading early on can increase children's higher levels of reading comprehension skills and predict their future academic achievement (Leahy & Fitzpatrick, 2017). Children's language skills are obviously of the utmost importance and teachers' professional knowledge and instructional practices consequently become a crux in determining the outcomes of children's language learning. However, teachers' instructional practices are frequently influenced

according to their beliefs derived from their knowledge, experience, culture, and understanding. Accordingly, classroom teachers do need to have sufficient conscious technical knowledge of the English language and clinical experience, so learners can be well instructed to acquire language skills. In addition, parents (home teachers) can be well coordinated with classroom teachers.

What are beliefs? Beliefs are what one believes to be the truth. Beliefs change one's attitudes, commitments, and ways of doing things. Beliefs are ideas shaped by personal experiences (Ford, 1994); they are a teacher's arguments and views on teaching and learning (Khader, 2012). However, a teacher's ideas, arguments, and viewpoints on teaching and learning are frequently affected by one's perception constructed according to one's professional knowledge, understanding, experience and culture (Chen & Chen-Worley, 2015; Chen-Worley, 2023).

Teachers' beliefs have a great impact on their decisions and classroom practices (Amiryousefi, 2015; Nation & Macalister, 2010) in terms of teachers' judgements and decisions about learners' abilities, classroom activities, and methodology for teaching and learning. For example, if learning is about receiving immediate learning effect regardless of whether there is a critical period for language development, then translation or translanguaging can be considered as a very helpful and effective approach/way to guide ELLs for language learning. Conversely, if critical period is believed to play a vital role in determining a learner's long-term learning effect (ultimate learning attainment) (Hartshorne et al., 2018), then a distinct appropriate teaching approach or paradigm should apply to optimize its potential and bring out the best learning effect. Accordingly, teachers' understandings and beliefs about the concept of critical period can have a great impact on how language lessons will be delivered and how ELLs will be guided to achieve the best learning effectiveness.

2.2. Critical Period of Language Development

Montessori (1870-1952) might be the first educator and pediatrician to advocate and identify six "sensitive periods" for child development - walking (1-2 years), concerns for details (1-2 years), need for order (0 - 2.5 years), unconscious grasp of language (0-3 years), conscious grasp of language (3-6 years), use of hand or refinement of hand movements and touch (1/2 - 5 years). Although the critical period for language development can be controversial, more empirical research studies should be conducted by taking many important variables into consideration, such as short term and long learning effects (ultimate attainment), the contexts where a second language is taking place. For example, according to research, English Language Learners (ELLs) require 3-5 years to achieve oral proficiency and 4-7 years to achieve academic English proficiency (Hakuta et al., 2000).

Despite the controversy, the effects of age on second language acquisition (SLA) have been acknowledged by educators and researchers. In addition, a great deal of neural and behavioral research has evidenced the critical period or sensitive period for language acquisition, including the fossilization of accent and pronunciation

after puberty (Brown, 1980). According to neuroscience, a critical period is defined as "a period of time in which intercellular communication alters a cell's fate" (Bear et al., 2007, p. 715.). The concept of "critical period" is based on Hans Spemann's study on embryo transplantation. Hans Spemann was a German embryologist who received a Nobel Prize in 1935. Many studies report that young children's speech can recover fast and fully if brain damage occurs before puberty. According to Bear et al (2007) and Thor (2008), brain function can be nearly 100% recovered if the nervous system is still in its immature stage where brain plasticity can be widespread. Many studies also point out that children and adults learn differently (Long, 1990; Paradis, 2004; Ullman, 2001) mostly due to brain lateralization (Rice, 2002) associated with the critical period. It is manifest that when the brain reaches a certain level of maturation (puberty), a second language learning and acquisition becomes difficult and the ability to acquire a native-like accent and pronunciation begins to decline (Acton, 1984; Lenneberg, 1967). Crain (2005) stated, "There is growing evidence that a critical period for rapid second language learning ends even prior to puberty perhaps at the age of 7 years" (p. 367). These suggest that the critical period ranges from birth to puberty. However, each individual's critical period for language development can be different and end at a different age within the range. On average, it ends at or by age 7 for most individuals.

2.3. Language Instructional Practices

Theory guides practice and practice informs theory. That means that there is a theory behind each teaching approach to guide practice. Reciprocally, practice based on empirical research-evidenced findings, through critical thinking and analysis can modify or adjust theory. Historically, there has been a long discussion based on research and practice about how language should be taught or learned. The approaches and strategies have been focused on two major skills - verbal and non-verbal communication with three language components, form (structure), content (meaning), and use (context) and a breakdown of four essential language skills - listening, speaking, reading, and writing. In addition, there is a theory or principle behind each approach to guide practice. Let's briefly review some of the well-known teaching approaches for example - Audiolingual Method (AM), Communicative Language Teaching (CLT), Phonics, Whole Language, Translation, and Translanguaging. The key concepts underpinning these instructional practices are age, unconscious vs. conscious learning, language learning purposes, and form (linguistic/grammatical competence) vs. content (meaning/communication). These teaching approaches and/or methods are briefly discussed below.

2.3.1. Audiolingual Method and Communicative Language Teaching

There are many interesting features for Audiolingual Method (AM) and Communicative Language Teaching (CLT) (Richards & Rodgers, 2001, 2014). According to AM, form and structure are more important than meaning. AM emphasizes that language is habit, so errors should be prevented. Sounds and structures, native-speaker-like

pronunciation, accuracy, linguistic competence (grammatical competence in Chomsky's term) should be sought but grammatical explanation, the use of a learner's L1 or translation at early levels should be avoided and forbidden. In other words, in order to speak like an English native speaker in terms of accurate pronunciation and linguistic/grammatical competence without grammatical explanation and the use of L1 or translation, language learning needs to be more unconscious, natural, and spontaneous. The principle of AM fits how younger children have been observed to acquire or pick up language. This also fits the concept of critical period in which neuroscience and research have evidenced the golden opportunities for language acquisition based on human biological nature (Bear et al., 2007; Lenneberg, 1967). The younger, the more native-speaker-like language gain can be achieved.

Whereas CLT emphasizes that meaning is of most importance. For CLT, language is generated by the learner through trial and error. Meaning, comprehensible pronunciation, fluency and acceptable language, communicative competence (the ability to use the linguistic system effectively and appropriately), and the use of L1 or translation when and where possible should be sought. In other words, within the tenet of CLT, language learning is more conscious and allows mistakes with the use of L1 or translation, when necessary, as long as language production is comprehensible/communicative. This fits how older children or adults have been observed to formally learn language. This also fits the concept of critical period in which language learning becomes more difficult and requires more effort if one's golden opportunities for language learning have elapsed based on human biological nature. The older, the less native-speaker-like language gain can be achieved. Therefore, more efforts, such as grammatical explanations, will need to be made for adults or older learners.

2.3.2. Phonics & Whole Language

Whole Language is a top-down reading model based on constructivist learning theory with a focus on meaning and communication instead of the word-by-word (bottom-up) reading strategies (Goodman, 2006). According to research, Whole Language works best with very young children (kindergarten) because traditional skills, such as phonics, spelling, grammar, and comprehension strategies are not explicitly taught (Mastropieri & Scruggs, 2014). As research points out, children do not develop phonemic awareness through normal speech. They require formal instruction to develop phonemic awareness. For example, the word, "school," has four sounds/phonemes, /s/-/k/-/u/-/l/, and four graphemes, s-ch-oo-l, teachers should help children associate which letters go with which sounds, so spelling and vocabulary skills can be easily developed according to the systematic linguistic rule and more advanced reading and writing skills can be achieved in due course. In addition, children with reading difficulties often demonstrate lack of phonemic awareness and need training to learn word-formation and sound-letter relationships (Pullen & Cash, 2011). Therefore, adopting and balancing both phonics and whole language should be the norm in the literacy classroom to guide children

towards proficient readers. It also implies that classroom teachers do need to have sufficient conscious knowledge in essential linguistics (Freeman & Freeman, 2014), so they can implement both approaches efficiently to guide children to develop successful literacy skills. Accordingly, functional phonic skills which require formal instruction should be taught first. The native-like pronunciation including accent, which are more unconscious-based learning should be exposed to very young children.

2.3.3. Translation and Translanguaging

From the discussion above about AM, CLT, Phonics, and Whole Language, what matters is not which instructional practice is the best or better than its compared counterpart, but which instructional practice fits and can bring out the best language learning effect according to a learner's age-appropriate biological and cognitive developmental stage. The key factors, such as age and conscious vs. unconscious learning, are related to a learner's biological and cognitive development. They are also closely related to an individual's critical period for language development (0-puberty) according to research; on average 0-7 years of age (Crain, 2005). If an instructional approach is applied without taking a learner's age-appropriate developmental factor into account, the ultimate language learning attainment (the long-term language learning effect) can be lost at the cost of ignorance, false belief, or instant gratification for a short-term language learning effect.

In language development, conscious learning refers to a learning behavior which requires formal training/schooling, and efforts to analyze, reason, and understand grammatical rules including translation, whereas unconscious learning refers to a learning behavior involving informal spontaneous learning. The pronunciation, accent, and grammatical rules are acquired or picked up through exposure or interaction with the native speakers in the natural environment. In this case, language learning for young children or learners still within the critical period, will tend to be more unconscious; while adults or learners whose critical periods have ended or are ending will require more conscious learning. Language learning is a long complex process (Larsen-Freeman, 1997). Although translation can work for both young children and adults, both short-term and long-term learning effects which are closely tied to critical period should be taken into consideration. English Language Learners (ELLs) require 3-5 years to achieve oral proficiency and 4-7 years to achieve academic English proficiency (Hakuta et al., 2000). As Hartshorne, et al. (2018) noted that there is a strong relationship between age difference and language ultimate proficiency.

Likewise, translanguaging, despite many forms of implementation, is a non-traditional language instructional practice with a focus on communication through the use of two or multiple languages in a sentence or context. The concept of translanguaging was first introduced by Cen Williams Wales in 1980's when English and Welsh were observed to be used among the learners to learn a lesson (Baker, 2001). The practice began to become more overt and popular in 2010's. The tenet/premise of translanguaging is to use multiple linguistic resources to

learn the lesson content in an informal, communicative, and collaborative way and move on to use more formal and precise English for the final products (Li, 2018). In addition, testing the proficiency of children in a language is not the same as testing children's proficiency in language (Otheguy et al., 2015). These can lower the affective filter (Krashen, 1986) to promote learning engagement through teamwork, self-identity, and equity in the assessment process. However, these may present a concern for achieving long-term language gains, independence, and formal/precise use of English. For example, the following simple sentences are all communicative and mean the same thing, "The cake tastes good today." The first two sentences (Today cake good and Today's cake good) are incorrect English but communicative. The last two sentences (今日の cake Hěn hào chī and Today 蛋糕 Hěn hào chī) are translanguaging. Both sentences have three languages (Japanese, English, and Chinese Mandarin). Unless you know the words or languages, they can be unintelligible. However, the major challenge here should be the syntactic structure. Once the learners pick up or are used to the syntactic structure, "Today cake" or "Today's cake" as the subject, it can be difficult to produce, "The cake" as the subject and "today" as an adverb in the end of the sentence.

The cake tastes good today.
 Today cake good
 Today's cake good
 今日の cake Hěn hào chī
 Today 蛋糕 Hěn hào chī

For more advanced or difficult syntactic structures based on subjunctive mood, it can be significantly challenging for many learners. For example, the following sentence structures indicate the speaker's impossible wish for the present and unfulfilled wish for the past.

"If I were a bird, I could fly."
 "I wish I had had enough money, so I would have had a beautiful house."

Although translation and translanguaging can help ELLs receive immediate understanding and assist teachers in the process of assessment – having a better understanding about an ELL's cognitive performance and distinguishing language difference from language disability, both short-term and long-term learning effects which are closely tied to critical period should be taken into consideration. The processes of human learning and outcomes can be conscious and unconscious (Kuldas et al., 2013).

Regardless of whether learning turns into acquisition (Ellis, 1994; Schmidt, 1990, 2001; Unlu, 2015), Krashen (1982, 1988) well distinguished the differences between language acquisition and language learning. According to Krashen, language acquisition is very similar to the process that children experience in acquiring their first language and second language. Language acquisition is a natural language development process where learners are engaging in subconscious learning and that subconscious learning is informal and spontaneous without being aware

of the grammatical rules. This explains why children tend to acquire a second language (L2) faster than older learners or adults and why most of us can easily master our own mother tongue. This fits within the innatist (Chomskyan) viewpoint. Language learning refers to the conscious learning about grammatical rules in the formal learning setting, such as a classroom or a native-speaker-like learning environment created by the teacher. The process is formal, analytical, and experiential and requires efforts for training, explanation, and translation. This explains why older learners or adults can learn a second or foreign language and achieve a certain level of proficiency. As such, this aligns more closely to a behaviorist (Skinner's) viewpoint.

2.4. Time and Age as Crucial Variables in the Language Learning Process and Ultimate Attainment

As stated previously, many ELLs have been overrepresented in special education disproportionality. In addition, for decades, research has repeatedly addressed the concern of literacy achievement gaps among students in the elementary and secondary education levels. As Lee, et al. (2007) reported, more than one-third of the 4th graders in the U.S. cannot successfully complete the schoolwork due to low reading levels.

Historically, there has been a long discussion based on research and practice about how language should be taught or learned. Many language teaching approaches are advent one by one as a reaction to the existing language teaching approaches. For example, translanguaging has gained its recent popularity due to the continuous achievement gap and the repeated research report about the overrepresentation issues for ELLs. Despite many different approaches, they all share the same common goal - to help every learner acquire language proficiency (i.e. linguistic and grammatic competences). However, language acquisition/ learning is a long complex process. Based on research, ELLs require 3-5 years to achieve oral proficiency and 4-7 years to achieve academic English proficiency (Hakuta et al., 2000). If we don't take both short-term and long-term language learning effects into consideration, which requires us to take the critical period concept into consideration and apply different appropriate language approaches based on a child's learning needs and potential, then we may be lost at the cost of ignorance, false belief, or instant gratification for a short-term language learning effect.

Although the critical period concept associated with language development, which has long been supported by science and research, may still be skeptical for some educators and researchers, there is a need to conduct more empirical research studies to investigate both in-service and preservice teachers' beliefs and understandings about the critical period concepts and their language instructional practices. Accordingly, this is what this empirical research study is about with the attempt of finding stories in the gaps through both quantitative and qualitative investigations.

3. Methods

Teachers' beliefs matter because they significantly affect their decisions and classroom practices. Due to the two significant education challenges that school teachers and administrators are constantly facing and struggling with – meeting the needs of diverse students particularly ELLs and literacy achievement gaps, there has been a need to investigate school teachers' beliefs and their instructional practices associated with their knowledge, experience, and understanding about ELLs' language learning and acquisition. The research question was as follows:

3.1. Research Question

What were teachers' beliefs about the critical period of language development and how did their beliefs affect their choices of language instruction for ELLs?

A mixed methods approach was used to conduct and analyze the results of the study. Quantitatively, descriptive statistics and Spearman's order-rank correlation (SPSS v. 29) were used to answer the research question. Qualitatively, thematic analysis (Braun & Clarke, 2021) was used to analyze and understand the participants' beliefs and viewpoints about the critical period concept in the process of language acquisition/learning and if using translation and a learner's native language (L1) could best benefit ELLs' language learning.

3.2. Subjects

About 420 participants of both current graduate students and alumni of the School of Education of a college in New York, voluntarily participated in this pilot study with a 5-point Likert scale e-Survey (1 = Strongly disagree, 2 = disagree, 3 = not sure, 4 = agree, 5 = strongly agree) through Qualtrics in 2017-2018. Of the 420 participants, 222 participants were selected because they completed the survey with almost no missing data. About 50% of the 222 participants (ages 20-63, 194 females and 28 males) are certified P-12 school teachers and the other 50% of the participants were paraprofessionals, substitute teachers, and/or graduate students. In New York, there were three sub-programs with three teacher certifications under the teacher education program. The three teacher certifications were B-2 (Birth – Grade 2, Early Childhood Education), Grades 1-6 (Childhood Education), and Grades 7-12 (Secondary Education). Each teacher certification certifies an individual to teach in different grade levels based on their qualified knowledge and experience in education. It is the purpose of the pilot study to find out both preservice teachers' and in-service teachers' overall knowledge, experience, and understanding in language teaching.

The Survey questions for this study were based on an original research project – a second language acquisition research study. All the survey questions for the L2 study were constructed according to literature review with both qualitative and quantitative questions. They were reviewed by some professionals and researchers in the field for suitability and efficacy. However, the survey questions related to this study were focused on the following 9

questions with an attempt to help readers gain more insights through more comprehensive and sophisticated analysis about language teaching and learning associated with the critical period concept (see below). To elicit useful and meaningful responses and obtain reliable data, the questions were designed to include closed-ended questions to obtain quantitative data and open-ended questions to obtain qualitative data. Q1 (Have you taken any classes in second language acquisition?) and Q2 (Do you have a second language [L2] learning experience?) were dichotomous questions. Participants would only need to answer yes or no. Q4 (I believe there is a critical period for language development) was a close-ended question with three choices, yes, no, and not sure. For the rest of the questions (Qs3, 5-12), participants would need to answer according to a Likert 5-point scale (1 = Strongly disagree, 2 = disagree, 3 = not sure, 4 = agree, 5 = strongly agree). Since these questions on the Likert scale were more on finding out participants' critical period concept associated with their perception or experience on language teaching strategies, such as translation, and since they are unambiguous and concrete to respondents, a single-item measure is appropriate (Bergkvist, 2014; Diamantopoulos, et al. 2012; Wanous, et al., 1997; Wanous & Hudy, 2001). Hence, estimating single-item reliability by using factor analysis is suitable (Ginns & Barrie, 2004). For this 5-point Likert scale, Spearman's order-rank correlation was used for factor analysis to analyze and determine the reliability and the relationships between variables (IV: belief in critical period, DVs: language instruction [translation, adults vs. children, ELL's L1, and ELL's culture]) because the quantitative data has met the three assumptions of Spearman's order-rank correlation – a monotonic relationship, ordinal data, observed variables in paired observations (Schober et al, 2018; Spearman, 1904).

1. Have you taken any classes in second language acquisition?
2. Do you have a second language (L2) learning experience?
3. I understand how a second language is acquired.
4. I believe there is a critical period for language development.
5. It is important to understand the concept of the critical period for language development in order to help ELLs learn English
6. I think both adults ELLs and children ELLs learn English in the same way.*
7. Doing translation is very helpful for younger ELLs in the English learning process.*
8. As a teacher to be, I think learning an ELL's 1st language can help an ELL learn English.
9. As a teacher, I think learning an ELL's culture can help an ELL learn English.

3.3. Data Sources

The data collection was completed after IRB's approval in 2017-2018. Over 6000 current graduate students and alumni of School of Education of a College in New York were initially invited to participate in this research study. About 650 participants voluntarily responded to the survey. Among the 650 participants, 230 participants did not fully complete the survey. They were

either not qualified at the time of the survey or opted out of the survey. The remaining 420 participants' responses were again filtered out based on whether the survey was completed with almost no missing data. About 222 responses were completed with almost no missing data. The collected data for this study were then analyzed both qualitatively and quantitatively based on 222 responses with no missing data. Quantitatively, descriptive statistics and Spearman's rank correlation (SPSS v. 29) were used to answer the research question. All statistical results were evaluated at $p < .05$ to obtain statistical significance. Qualitatively, thematic analysis (Braun & Clarke, 2021) was used to analyze and understand the participants' beliefs and viewpoints about the critical period concept in the process of language development and if using translation and/or a learner's native language for language teaching and learning was an effective practice.

4. Results and Discussion

4.1. Quantitative Results

Depending on the nature of a question, some codes were reversed before computation. The major findings for this research study based on participants' self-report were the following:

Quantitatively, most participants (77.5%) had not taken any class in second language acquisition and half of participants (51.4%) had no L2 learning experience. However, most participants (76.2%) reported that they understood second language acquisition or learning (see Table 1). In addition, 79.3% of the participants believed it to be true that there is a critical period in the process of language acquisition (see Table 2). Meanwhile, 82% of the participants considered it important to understand the concept of the critical period in order to help ELLs learn English (see Table 3). For this non-parametric study based on a 5-point Likert scale, Spearman's rank-order correlation was run to assess the relationships between the variables and reliability because three assumptions were met. First, there was a monotonic relationship between two variables measured. Second, the observed variables were measured on an ordinal scale. Third, the observed variables were paired observations (Schober et al, 2018). Therefore, according to Spearman correlation, there was a statistically significant positive correlation ($r = .152$, $p < .05$) between Q3 understanding L2 language acquisition and Q5 understanding critical period. This means that based on the test observed result, most participants believed that they understood how a second language is learned or acquired and they also believed that understanding the concept of critical period is important in the process of L2 language learning and acquisition. This finding is reliable and less unlikely to have occurred due to chance.

Table 1. Knowledge of Second Language Acquisition (Q3 L2_Kn)

	Frequency	Percent
Strongly disagree	5	2.3
Disagree	12	5.4
Not sure	36	16.2
Agree	122	55.0
Strongly Agree	47	21.2
Total	222	100.0

Table 2. Belief in Critical Period of Language Acquisition (Q4 L2_Kn_Cr)

	Frequency	Percent
No response	14	6.3
No (please explain)	9	4.1
Not sure (please explain)	23	10.4
Yes (please explain)	176	79.3
Total	222	100.0

Table 3. Belief in the Importance of Understanding Critical Period (Q5 L2_Kn_Cr_im)

	Frequency	Percent
Strongly disagree	8	3.6
Disagree	5	2.3
Not sure	27	12.2
Agree	85	38.3
Strongly Agree	97	43.7
Total	222	100.0

When asked (Q6) if both ELL adults and children learn in the same way, 69.4% of the participants didn't think that both ELL adults and children learn in the same way (see Table 4). Based on neuroscience about brain plasticity (Thor, 2018), adults and children do not learn in the same way because children can pick up language much more easily than adults due to critical period. According to the Spearman correlation, although there is a positive relationship between Q5 understanding the importance of critical period and Q6 (reverse coding) adults and children learning in a different way, the relationship has not reached statistical significance ($r = .062$, $p > .05$). The null hypothesis can't be rejected. This means that based on the observed test result, many participants believed in understanding the importance of critical period, and they also didn't believe that adults and children learn in the same way. However, this finding is likely to have occurred due to chance or random factors.

Table 4. Language Learning Differences in Adults and Children (Q6 L2_Kn_In_AC_6R)

	Frequency	Percent
Strongly Agree	7	3.2
Agree	27	12.2
Not sure	34	15.3
Disagree	83	37.4
Strongly Disagree	71	32.0
Total	222	100.0

For translation (Q7), most participants (70.7%) believed that doing translation was most beneficial to help younger ELLs acquire language skills. However, a very small number of the participants (8.1%) disagreed with using the translation as an effective language instruction approach. Moreover, 21.2% of the participants were not sure about the answer (see Table 5). Based on research and literature review, language learning for young children tends to be more unconscious, while language learning for adults tends to be more conscious. Conscious learning refers to a learning behavior which requires formal training/schooling, and efforts to analyze, reason, and understand grammatical rules including translation, whereas unconscious learning refers to a learning behavior involving informal spontaneous learning. The pronunciation, accent, and grammatical rules are acquired or picked up through exposure or interaction with the native speakers in the natural environment. Language learning is a long complex process (Larsen-Freeman, 1997). Although translation can immediately work for both young children and adults, both short-term and long-term learning effects which are closely tied to critical period should be taken into consideration. English Language Learners (ELLs) require 3-5 years to achieve oral proficiency and 4-7 years to achieve academic English proficiency (Hakuta et al., 2000). As Hartshorne, et al. (2018) noted that there is a strong relationship between age difference and language ultimate proficiency.

According to Spearman rank-ordered correlation, there is a negative relationship between Q5 understanding the importance of critical period and Q7 using translation as a very helpful way of language instruction for younger ELLs, which has reached statistical significance ($r = -.248, p < .001$). This means that in the language acquisition and learning process, participants believed in the importance of critical period and the use of translation as a very effective way of language instruction for younger ELLs. The finding is reliable and unlikely to have occurred due to chance or random factors. However, this finding is not quite consistent with what research and literature review about the critical period concept associated with age differences and the concept of conscious and unconscious learning.

Table 5. Using Translation as the Most Effective Language Instruction (Q7 L2_Kn_In_Trans_7R)

	Frequency	Percent
Strongly Agree	72	32.4
Agree	85	38.3
Not sure	47	21.2
Disagree	16	7.2
Strongly Disagree	2	.9
Total	222	100.0

Finally, when asked (Q8) if learning an ELL's 1st language could help an ELL learn English, most participants (75.6%) supported the concept (see Table 6). Also, a higher number of participants (90.5%) believed that learning an ELL's culture could help an ELL learn English (Q9). Evidently, learning an ELL's culture outweighed learning an ELL's first language as an effective

way to facilitate language learning (see Table 7). According to Spearman's order-rank correlation, there was a positive correlation ($r = .124, p > .05$) between Q5, understanding the importance of critical period and Q8 learning an ELL's L1 to support an ELL to learn English (see Table 6). However, it did not reach statistical significance. In other words, in the language acquisition and learning process, participants believed in the importance of critical period and learning an ELL's L1 to support an ELL to learn English. However, the finding is not reliable and may have occurred due to chance or random factors. On the other hand, according to Spearman's order-rank correlation, there is a positive correlation ($r = .145, p < .05$) between Q5, understanding the importance of critical period and Q9 learning an ELL's culture to support an ELL to learn English. This means that in the language acquisition and learning process, participants believed in the importance of critical period and learning an ELL's culture to support an ELL to learn English. The finding is reliable and unlikely to have occurred due to chance or random factors. Helping an ELL learn English, learning and understanding an ELL's L1, and culture are important because culture reflects in language and culture helps understand a speaker's true or intended expression. For example, "a bright bead in one's palm" (掌上明珠) in Chinese means the same thing as "the apple of one's eyes" (眼中的蘋果) in the U.S. However, learning and understanding an ELL's culture is not more important than learning and understanding an ELL's L1 language system since understanding language differences through contrasting and analyzing two linguistic systems can help teachers guide ELLs to learn English. For example, Aren't you a student? In English, if you are not a student, the answer will be, "No, I am not." However, in Chinese, if you are not a student, the answer will be, "Yes, I am not." In this case, understanding how Chinese works can help communicate with Chinese speakers.

Table 6. Using an ELL's 1st Language to Support Language Learning Q8 (L2_Kn_In_ELL_L1)

	Frequency	Percent
Missing	4	1.8
Strongly Disagree	5	2.3
Disagree	17	7.7
Not Sure	28	12.6
Agree	86	38.7
Strongly Agree	82	36.9
Total	222	100.0

Table 7. Using an ELL's Culture to Supporting Language Learning (Q9 L2_Kn_In_ELL_Cul)

	Frequency	Percent
Strongly Disagree	4	1.8
Disagree	5	2.3
Not Sure	12	5.4
Agree	54	24.3
Strongly Agree	147	66.2
Total	222	100.0

4.2. Qualitative Results

Qualitatively, thematic coding analysis (Braun & Clarke, 2021) was used to analyze the collected qualitative data with a focus on the reasons why most participants (82%) believed that understanding the concept of the critical period in the process of language development was important and if using translation and/or a learner's L1 was an ultimate effective language instructional practice. Five major common reasons/categories were identified. They were as follows:

4.2.1. Age

Based on research, the critical period ranges from birth to puberty. However, each individual's critical period can be different and end at a different age within the range. On average, it ends at or by age 7 for most individuals. As Crain (2005) stated, "There is growing evidence that a critical period for rapid second language learning ends even prior to puberty perhaps at the age of 7 years" (p. 367).

The responses for critical period in terms of the age range are significantly varied. There are at least 12 age ranges (0-2, 0-4, 0-5, 0-6, 0-7, 0-10, 1-3, 2-8, 3-5, 3-6, 4-6, 5-7). Some examples directly quoted from the participants are shown below. These varied age ranges reflect participants' beliefs, observations, knowledge and experiences, which can affect varied practices.

"I believe the time when a child learns the language best is during their developmental stages of 1-3 years of age."

"A critical period for acquiring language is from 2-8 years old."

"I believe that the critical period occurs prior to age 7."

"Children learn a second language faster when they are under the age of 5."

"Between the ages of 3 and 6."

"Birth-24 month."

"Ages 4-6 is the best time to teach a child a new language."

"I believe the time when a child learns the language best is during their developmental stages of 1-3 years of age."

"I believe all students learn at their own pace. I do not think that there is a specific age which students learn language development. All students vary."

4.2.2. Brain functioning

Many studies report that young children's speech recovers rapidly and completely if brain damage occurs before puberty (Bear et al., 2007; Thor, 2008). Many studies also point out that children and adults learn differently (Long, 1990; Paradis, 2004; Ullman, 2001) mostly due to brain lateralization (Rice, 2002) associated with the critical period. It is self-evident that when the brain reaches a certain level of maturation (puberty), a second language learning and acquisition becomes difficult and the ability of acquiring a native-like accent and pronunciation begins to degenerate (Acton, 1984; Lenneberg, 1967).

Here are some direct quotes from the participants. They are congruent with research on young age and brain plasticity for language learning.

"From birth to 6 years old children have absorbent mind and this age is critical to learn language."

"The younger the student is, the more plastic is their brain."

"It is understood in the scientific community that there is a language acquisition window of opportunity for deep, long-term memory of language from conception to 4 years of age."

"I believe language is learned best in young children when the mind is able to absorb more information regarding language."

4.2.3. Pedagogies

There is a long discussion history based on research and practice about how language should be taught or learned. In language development, conscious learning refers to a learning behavior which requires formal training/schooling, and efforts to analyze, reason, and understand grammatical rules including translation, whereas unconscious learning refers to a learning behavior involving informal spontaneous learning. The pronunciation, accent, and grammatical rules are acquired or picked up through the exposure or interaction with the native speakers in the natural environment. In this case, language learning for young children or learners still within the critical period, will tend to be more unconscious; while adults or learners whose critical periods have ended or are ending will require more conscious learning (Krashen, 1982, 1988).

Here are some examples reflecting participants' current understanding of language pedagogies associated with critical period and if specific training on L2 differentiation instruction and/or further guidance is needed for participants.

"I have read conflicting research that suggests that children acquire language easier than adults. I have also read research that suggests that it is the conditions in which children learn a second language (i.e. attending school) that make it easier for them to acquire the L2 and not a distinct cognitive difference. I am not sure which is more substantiated among linguists."

"The student stores the information and when he is ready after a long period of listening, he starts to produce the language and that is when the teacher lower gradually her scaffolding strategy."

"There is an importance in hearing sounds and the way words are spoken within a specific language that has been proven by studies showing if you were never exposed to a certain sound as a baby, you will never be able to make that sound just like a native speaker."

"I believe that kids are able to acquire L2 at a faster rate than adults, especially if they are immersed in that language. To help ELLs acquire the English language faster, I incorporate many opportunities for them to use the English language, For instance: having them repeat what I say, doing many rhymes, finger plays and songs."

"I believe that the more experienced and knowledgeable you are in your native language, the easier it is for you to transfer those skills into a new language. On the other hand, it is also believed that children learn best and faster"

when they are younger as they are equipped to absorb the new information faster and better than other students.”

4.2.4. Personal experiences

Theory guides practice and practice informs theory. Both theory and practice go hand in hand. Likewise, both knowledge and experience are important and complementary. We all learn through experience and tend to use our experience to guide us how things work until we acquire new knowledge to reshape how things should work. The following direct quotes from the participants suggest that age plays a role in affecting language learning proficiency because younger learners tend to do unconscious learning more easily; whereas older learners or adults tend to do conscious learning more easily (Bear et al., 2007; Lenneberg, 1967; Krashen, 1982; Hartshorne et al., 2018).

“Yes! I tried recently to learn a new language and it’s SO much harder than when I was in middle school!”

“In my experience, it has been stated that the youth learn quicker than adults when it comes to learning a language.”

4.2.5. Social interactions

Language acquisition and learning require exposure and social interactions to the native speakers in a natural learning environment to achieve native-speaker-like language proficiency. The more natural the learning environment is, the better chance there is for a learner to pick up language and achieve language proficiency particularly for younger learners (Bear et al., 2009; Brown, 1980; Paradis, 2004; Hartshorne et al., 2018; Thor, 2008;). The following direct quote reflects the importance of language exposure and social interactions with native speakers or proficient speakers in the process of language acquisition and learning in order for language learners to achieve language proficiency.

“When students are placed in a social setting and grouped with proficient speakers, they can better acquire the language.”

5. Conclusion

Based on the results of the study, most participants have not taken any L2 courses, but they believe that they understand how a 2nd language is learned or acquired. They also believe that there is a critical period for language development, and it is important to understand the concept of critical period because the younger a learner is, the easier it is to pick up a new language. This belief is congruent with research and literature. However, interestingly, most participants also believe that using translation or an ELL’s L1 can be very effective in helping ELLs learn English. Their belief about using translation or L1 for instruction is not well connected with the concept of critical period where age plays a role in affecting learning and teaching. If translation or translanguaging is considered as an automatic effective way to guide ELLs for language learning without considering age and learning effects (for both short-term and long term), then translation or translanguaging will most likely be widely

practiced in the classroom regardless of whether there is critical period in the process of language development. In other words, if an instructional approach is applied without taking a learner’s age-appropriate developmental factor into account, the ultimate language learning attainment (the long-term language learning effect) can be lost at the cost of ignorance/false belief or instant gratification based on a short-term language learning effect.

The findings of the study also reveal that participants have significantly different opinions about the age range of critical period and have a hard time practicing effective differentiated instruction based on the concept of critical period. Classroom teachers regardless of native speakers or non-native speakers of English do need to have sufficient conscious content knowledge about the English language (essential linguistics) and a clear understanding about critical period for language development, so they can well link their belief with their instructional practice to best benefit ELLs’ language learning.

These findings can provide insights for teacher education programs for curriculum renovation to further guide their teacher candidates to assist ELLs in terms of assessment and instruction, so the concern for disproportionality issues can be addressed and literacy achievement gaps can be one step further to be closed.

6. Pedagogical Implications

The findings of the study contributing to our understanding and thinking have significant implications.

First, the participants’ belief that there is a critical period in the process of language acquisition because the younger one is, the easier it is to acquire a new language. It is congruent with research and literature.

Second, the participants’ belief in the critical period of language acquisition does not support their understanding of how to apply the concept of critical period into practice to bring out the best learning and teaching effects. This is evident from the participants’ self-report on the age ranges of critical period and difficulty in practicing effective differentiated instruction based on the concept of critical period. This implies that teachers do need to have sufficient conscious content knowledge about the English language (essential linguistics) and a clear understanding about the concept of critical period, so they can well link their belief with their instructional practice to best benefit ELLs’ language learning.

Third, the use of translation or L1 for instruction is not well connected with the concept of critical period where age plays a role in affecting learning and teaching. In other words, if translation or translanguaging is considered as an automatic effective way to guide ELLs for language learning without considering age and learning effects (for both short-term and long term), then translation or translanguaging will be widely practiced in the classroom regardless of whether there is critical period in the process of language acquisition. In other words, if an instructional approach is applied without taking a learner’s age-appropriate developmental factor into account, the ultimate language learning attainment (the long-term

language learning effect) can be lost at the cost of ignorance/false belief or instant gratification based on a short-term language learning effect. Fourth, these findings can provide insights for teacher education programs for curriculum renovation to further guide their teacher candidates to assist ELLs in terms of assessment and instruction, so the concern for disproportionality issues can be addressed and literacy achievement gaps can be one step further to be closed.

7. Limitations of Study

The qualitative data collection was based on participants' self-report on the questions in the survey via Qualtrics. Some answers can be dishonest and/or biased. Due to IRB restrictions, follow-up interviews were not able to be conducted to get more in-depth and comprehensive information based on the participants' answers to the survey questions.

8. Further Studies

A qualitative study by using semi-structured interviews can be conducted to get more in-depth and comprehensive viewpoints from the participants to investigate their understanding of the concept of the critical period and how they apply the concept of critical period to differentiate instructions to bring out the best possible learning effects.

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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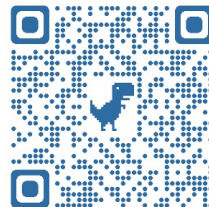
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