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PROMOTING EARLY-ADOLESCENT DUAL LANGUAGE LEARNERS'

LANGUAGE USE AND READING SKILLS

A DISSERTATION SUBMITTED TO

THE FACULTY OF THE GRADUATE SCHOOL

IN CANDIDACY FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

PROGRAM IN DEVELOPMENTAL PSYCHOLOGY

BY

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ABSTRACT

Most studies of Dual Language Learners' (DLLs') literacy development focus on the early childhood years. As such, this three-study dissertation sought to advance our knowledge of DLLs' English language and reading comprehension skills during early adolescence, a developmental stage when many students struggle with reading. Study 1, "Classroom Discussion and Early-Adolescent Dual Language Learners' Motivation and Reading Comprehension", considered how features of the classroom language environment promote DLLs' reading comprehension skills. We examined relations between students' ($N = 413$; M age = 11.66-years-old) engagement in high-quality classroom discussions and reading comprehension as a function of their motivation to participate in classroom discussion. Given that teachers' questioning practices shape students' opportunities to engage in high-quality discussions, we also characterized teachers' ($N = 32$; M age = 36.531 years old) questioning practices across the school year and examined how teachers' questioning was related to their students' reading comprehension. Study 2, "Bilingual Language Skills and Early-Adolescent Dual Language Learners' Reading Comprehension", examined how DLLs' ($N = 19$; M age = 11.84-years-old) oral language skills (i.e., vocabulary, syntax) in English and Spanish were related to their English reading comprehension skills. Study 3, "Bi-literacy and Motivation as Predictors of Bilingual Students' Talk During Classroom Discussion", investigated how DLLs' ($N = 121$; M age = 12.12-years-old) motivation to participate in classroom discussion was related to their amount of talk during discussion and whether this relation varied as a function of DLLs' bi-literacy (i.e.,

reading and writing skills in English and Spanish). The results of these three studies, together,

suggest that early-adolescent DLLs' reading comprehension skills are promoted by high levels of

student motivation for classroom discussion, strong English and Spanish oral language skills, and

classroom language environments characterized by opportunities to engage in high-quality,

authentic classroom discussions.

CHAPTER ONE

GENERAL INTRODUCTION

Latinos comprise close to 30% of the students enrolled in public schools in the United

States, and this percentage is projected to continue increasing (NCES, 2021a). Given that most

U.S. Latinos speak Spanish at home (i.e., 73% Spanish-speaking; Krogstad, Stepler, & Lopez,

2015), the number of Dual Language Learners (DLLs, often referred to as bilinguals) enrolled in

U.S. schools is also expected to rise. Spanish-English DLLs bring unique cultural and linguistic

strengths to the classroom, which may support their English language and literacy development

(see García & Ozturk, 2017). However, given that much of the United States education policy is

designed to support English monolingualism rather than bilingualism (de Jong, 2013), there are

missed opportunities to build on DLLs' language-related strengths in the classroom. Thus, to

create more equitable educational experiences for bilingual students, researchers have called for

greater attention to the factors that may promote DLLs' academic success, including in the

domains of language and reading (see Romo, Thomas, & García, 2018 for review).

It is particularly important to attend to the factors that support DLLs' reading

comprehension skills during early adolescence—a developmental period characterized by

biological, cognitive, and environmental change (Wigfield, Byrnes, & Eccles, 2006). Given the

turbulence associated with this developmental period, research findings have suggested that early

adolescents may be at heightened risk for low motivation and disengagement in important

academic activities, including reading (see Wigfield et al., 2015 for review). For example, early

adolescents, who find themselves in middle school classrooms that are more competitive and less

supportive than elementary school classrooms, may begin to have more negative views of their

own reading skill in comparison to their peers (Wigfield, Gladstone, & Turci, 2016). When

students have negative views of their reading skills, they often choose to disengage from reading

(Guthrie & Wigfield, 2017). Indeed, this risk for early adolescents' disengagement in reading-

related activities is reflected in the low reading comprehension skills of United States

adolescents, which has persisted for decades (NAEP, 2019). Thus, a comprehensive

understanding of the factors that contribute to early adolescents' reading comprehension skills is

needed to raise these low literacy rates.

The Componential Model of Reading (CMR; Aaron, Joshi, Gooden, & Bentum, 2008;

Joshi, 2019) provides a comprehensive view of the domains that contribute to reading

comprehension, including 1) the cognitive domain, 2) the psychological domain, and 3) the

ecological domain. The cognitive domain, influenced by the Simple View of Reading (Hoover &

Gough, 1990), emphasizes the importance of language skills, specifically, word reading and

linguistic comprehension. The psychological domain consists of affective factors, like motivation

and engagement. Finally, the ecological domain consists of students' environments, including

their home and classroom environments. Indeed, recent research has suggested that language

skills (Aguilar et al., 2020; Phillips Galloway, Uccelli, Aguilar, & Barr, 2020), motivation for

literacy-related activities (Griskell, Gámez, & Lesaux, 2020a, 2020b), and environmental factors

(Gámez, Griskell, Sobrevilla, & Vazquez, 2019; Gámez & Lesaux, 2012; 2015) contribute to

DLLs' English language and reading comprehension development. Thus, in the present

dissertation, we examine how factors in the cognitive, psychological, and ecological domains are

related to early adolescent DLLs' English reading comprehension. We describe the significance of each of these three domains below.

The cognitive domain: Language skills and reading comprehension

The cognitive domain of the CMR (Aaron et al., 2008; Joshi, 2019), which is heavily influenced by the Simple View of Reading (Hoover & Gough, 1990), consists of two language skills, specifically, word recognition and linguistic comprehension. The authors of these two theoretical perspectives (Aaron et al., 2008; Hoover & Gough, 1990; Joshi, 2019) state that successful readers must be able to quickly recognize each word in text and derive a mental representation of that word. At the same time, successful readers engage in linguistic comprehension by turning word information into sentence and discourse interpretation. If students can recognize individual words but cannot make sense of the sentences and paragraphs that these words compose, they will struggle with reading comprehension. Likewise, if students can comprehend language well, but cannot recognize individual words, they will not be able to comprehend the text. Thus, the cognitive domain of the CMR (Aaron et al., 2008; Joshi, 2019), and the Simple View of Reading (Hoover & Gough, 1990), consider both effective word reading and linguistic comprehension skills to be requisites for successful reading comprehension.

Decades of empirical research show support for the Simple View of Reading (Hoover & Gough, 1990), with findings demonstrating that DLLs' English word reading and linguistic comprehension skills (e.g., oral language skills) are positively related to their English reading comprehension (Hoover & Gough, 1990; Lesaux, Crosson, Kieffer, & Pierce, 2010; Nakamoto, Lindsey, & Manis, 2007; Proctor et al., 2005; 2006; Taboada Barber, Lutz Klauda, & Stapleton, 2020). At the same time, it has been argued that the Simple View of Reading may inadvertently mask the complexity of reading comprehension, including for dual language learning populations

(Catts, 2018; Duke & Cartwright, 2021; LARRC, 2015; Taboada Barber, Cartwright, Hancock, & Klauda, 2021). That is, although linguistic comprehension is composed of many oral language skills, most studies have focused on one skill in particular, vocabulary (e.g., Gillanders, Castro, & Franco, 2014; Garcia, 2018; Goodrich & Namkung, 2019; Grimm, Solari, & Gerber, 2018), to the exclusion of other important oral language skills. Thus, there is a need for research that examines other components of oral language, including syntax (i.e., the awareness of and the ability to manipulate sentence structure; Mokhtari & Thompson, 2006), which is critical in supporting older learners' reading comprehension.

The psychological domain: Motivation, engagement, and reading comprehension

The psychological domain of the CMR (Aaron et al., 2008; Joshi, 2019) includes affective variables, such as motivation and engagement. Motivation has been described in the literature as an energizer and director of behavior, often in relation to the beliefs, values, and goals that individuals have for an activity (Eccles & Wigfield, 2002; Guthrie, Wigfield, & You, 2012; Wigfield & Eccles, 2020). Motivation is also described as being domain-specific (Guthrie, Wigfield, & You, 2012). That is, students' level of motivation for reading may be different than their motivation for other literacy-related activities, like motivation to participate in classroom discussion. At the same time, research demonstrates that motivation is multi-dimensional, which means that there are multiple reasons why students would choose to engage in an activity, like reading (Baker & Wigfield, 1999; Taboada Barber, Levush, & Lutz Klauda, 2018; Wigfield, Gladstone, & Turci, 2020; Wigfield & Guthrie, 1997). For instance, recent reading motivation literature has presented the acronym SMILE to represent the multiple dimensions of students' reading motivation, including S for social motivation, M for me (in reference to self-efficacy or beliefs about one's capabilities), I for importance (value), L for liking (interest), and E for

engagement, which is a product of the previous dimensions (Guthrie & Wigfield, 2017; Taboada Barber & Lutz Klauda, 2020).

Theoretical perspectives, like the Engagement Perspective on Reading (Guthrie & Wigfield, 2000; Guthrie, Wigfield, & You, 2012) suggest that, together, motivation and engagement, characterized by direct involvement, effort, and persistence in a task (Fredricks, Blumenfeld, & Paris, 2004), contribute to students' literacy development. Indeed, empirical research supports this perspective by demonstrating that motivation and engagement are important for adolescents' reading-related outcomes (Froiland & Oros, 2013; Guthrie, Klauda, & Ho, 2013; Klauda & Guthrie, 2015; McGeown, Duncan, Griffiths, & Stothard, 2015; see Wigfield, Gladstone, & Turci, 2016 for review). At the same time, early adolescence is a developmental period when students' motivation and engagement in academic activities decreases (Gnambs & Hanfstingl, 2016; Wigfield et al., 2015), including for reading-related activities (Unrau & Schlackman, 2006). Further, research suggests that the relation between motivation and students' academic performance strengthens as students get older (see Wigfield & Gladstone, 2019). Thus, early adolescence is a key developmental period to investigate students' motivation as it relates to language skills and reading comprehension. Yet, in comparison to studies of English monolingual students, few studies have focused on DLLs' motivation for reading-related activities (Griskell, Gámez, & Lesaux, 2020a; 2020b; Proctor et al., 2014; Taboada Barber et al., 2015; Taboada Barber et al., 2020). Thus, further research is needed to detail how motivation and engagement may be leveraged to support early-adolescent DLLs' reading comprehension development.

The ecological domain: Home and school environments and reading comprehension

   Many empirical studies have examined the student-level variables that support reading comprehension, including oral language skills (see Uccelli, Phillips Galloway, & Qin, 2020 for review) and motivation (see Wigfield, Gladstone, & Turci, 2016 for review). However, student-level variables cannot be well-understood without placing them in a larger context. That is, individual students' language skills and motivation must be considered with their environments in mind. The ecological domain of the CMR (Aaron et al., 2008; Joshi, 2019) refers to these contexts, including students' home and school environments. A large body of research demonstrates that the home language environment is an important contributor to students' language and reading comprehension development (see Sénéchal, Whissell, & Bildfell, 2017 for review). For example, especially for DLLs, a unique aspect of the home environment is the exposure to and use of a home language other than English (U.S. Department of Health and Human Services, 2016). Research suggests that, at least during early childhood, DLLs' home language skills may support the development of their English language skills (see Hammer et al., 2014 for review). There is significantly less research investigating the contributions of DLLs' home language skills to their English language and reading skills as they get older, in particular, during early adolescence (Aguilar, Uccelli, & Phillips Galloway, 2020). Thus, research is needed to examine the ways in which DLLs' home language skills may contribute to their English reading comprehension later in development.

   The classroom is also a critical environment for DLLs' English language and literacy learning (see Gámez, 2020 for review). In the classroom, teachers can intentionally provide DLL students with instruction in English language and reading skills (Gillanders, Castro, & Franco, 2014). Moreover, the classroom environment is a context where DLLs can develop their English

language and reading comprehension skills through everyday exposure to teachers' language use (Gámez & Levine, 2013; Gámez, 2015), peers' language use (Gámez, Griskell, Sobrevilla, & Vazquez, 2019), and opportunities to use language themselves (Zhang, Anderson, & Nguyen-Jahiel, 2013). Yet, again, in comparison to research regarding young DLLs' classroom language environments (see Castro, Páez, Dickinson, & Frede, 2011 for review), very few studies have examined the aspects of the classroom language environment that promote early-adolescent DLLs' reading comprehension (Gámez & Lesaux, 2012; 2015). Gaining knowledge about the classroom environment features that support early-adolescent DLLs' literacy is critical because the language skills that support reading comprehension change across development (Lervag, Hulme, & Melby-Lervag, 2018; Ricketts et al., 2020). Thus, the classroom environment factors that support older learners' reading comprehension likely also differ from those that support the reading skills of younger learners (Gámez, 2020). Given these developmental differences, further studies are needed which detail the aspects of the classroom language environment which promote early-adolescent DLLs' reading comprehension skills.

Overview of Study 1, Study 2, and Study 3

With these study findings in mind, the current dissertation examines variables within the CMR (Aaron et al., 2008; Joshi, 2019) to provide a greater understanding of the multiple factors that support early-adolescent DLLs' reading comprehension. Guided by the CMR's focus on the ecological domain, Study 1, "Classroom Discussion and Early-Adolescent Dual Language Learners' Motivation and Reading Comprehension" examines how DLLs' engagement in the classroom language environment, through classroom discussion, relates to their reading comprehension. We specifically ask, given the opportunity to participate in an authentic discussion environment, "*how do DLLs' motivation for and engagement in high-quality*

discussion practices relate to their reading comprehension?" To examine this relation, we must understand how students' environments either encourage or restrict their participation in authentic classroom discussions. Given that teachers' classroom questioning practices are a feature of the classroom environment that determine students' opportunity to engage in authentic classroom discussions, Study 1 also investigates teachers' questioning practices. Specific research questions include, "*how do teachers' questioning practices relate to their DLL students' reading comprehension?*" and "*how can we characterize teachers' use of questioning practices across the school year?*" Given that most research is focused on the student-level variables that support reading comprehension (see Uccelli, Phillips Galloway, & Qin, 2020; Wigfield, Gladstone, & Turci, 2016), Study 1 contributes to the literature through identifying specific features of the classroom language environment that support early-adolescent DLLs' reading comprehension.

Grounded in the cognitive domain of the CMR, Study 2, "Bilingual Language Skills and Early-Adolescent Dual Language Learners' Reading Comprehension" examines how students' language skills, in Spanish and English, relate to their English reading comprehension. Specifically, this study examines two oral language skills, vocabulary and syntax, in relation to DLLs' reading comprehension. Research questions for this study include, "*how do DLLs' English oral language skills relate to their English reading comprehension?*" and "*how do DLLs' Spanish oral language skills relate to their English reading comprehension?*" Because most studies of DLLs' language skills are focused on one oral language skill, vocabulary (e.g., Garcia, 2018; Goodrich & Namkung, 2019; Grimm, Solari, & Gerber, 2018), Study 2 contributes to the literature through investigating the relation between syntactic knowledge and reading comprehension for early-adolescent DLLs.

Finally, published in the *International Journal of Bilingual Education and Bilingualism*, Study 3, "Bi-literacy and Motivation as Predictors of Bilingual Students' Talk During Classroom Discussion" examines motivational factors in the psychological domain of the CMR. In particular, we examine relations between DLLs' motivation for classroom discussion, self-reported bi-literacy skills (i.e., reading and writing skills in English and Spanish), and amount of talk during classroom discussion. Our specific research questions are "*how does motivation to participate in classroom discussion differ for bilinguals as a function of their reported bi-literacy?*" and "*how do motivation and bi-literacy relate to bilingual students' amount of talk during classroom discussion?*" Given that most studies examining students' motivation focus on English monolingual students (see Wigfield & Gladstone, 2019 for review), our study adds to the motivation literature through examining how motivation relates to engagement in reading-related activities, specifically for DLLs.

CHAPTER TWO

STUDY 1: CLASSROOM DISCUSSION AND EARLY-ADOLESCENT DUAL LANGUAGE

LEARNERS' MOTIVATION AND READING COMPREHENSION

For decades, there have been concerns about the reading comprehension skills of early

adolescents in the United States (Davidson & Koppenhaver, 2017). Given the connection

between reading comprehension and language skills (e.g., Dorin Dolean, Lervag, Visu-Petra, &

Melby-Lervag, 2021; Khan & Justice, 2020; Lervag, Hulme, & Melby-Lervag, 2018; Hjetland et

al., 2019), there has been a push to increase students' access to high-quality language

environments (Chow, Cunningham, & Wallace, 2020; Flynn, 2016; see Gámez, 2020 for review;

Wallace et al., 2021). Particularly for Dual Language Learners (DLLs), whose families speak a

non-English language at home (Administration for Children and Families, 2013), the classroom

language environment has been shown to be an important contributor to English reading skills, at

least during early childhood (Gámez, 2015; Gámez et al., 2017; 2019; Garcia, 2018; Phillips

Galloway & Lesaux, 2017; Pizzo & Páez, 2017; Sawyer et al., 2018). Despite research

suggesting that the quality of language exposure (rather than the amount of language exposure)

has special developmental importance for older learners' language-related skills (Gámez &

Lesaux, 2012; 2015), there is a limited literature base detailing the specific features of high-

quality language that predict early-adolescent DLLs' reading comprehension (Gámez, 2020).

Thus, it is important to examine early-adolescent DLLs' classroom language environments and

identify which high-quality language features support their reading comprehension skills.

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For the older learner, teacher questions have stood out as a potentially important feature of the classroom language environment that promotes learning (Ernst-Slavit & Pratt, 2017; Smart & Marshall, 2013). Teachers often use questions to check student understanding, but teachers' questioning may serve other purposes in the classroom, including to extend student thinking and to provide opportunities for student discussion (Walsh & Sattes, 2015). That is, teachers' questions create classroom language environments that either enable students' high-quality discussions about text (by inviting students to use language) or restrict them (by returning the control of the discussion to the teacher; Murphy et al., 2017). Prior research suggests that engaging in high-quality classroom discussions promotes older learners' reading comprehension outcomes (Li et al., 2016; Matsumura et al., 2013; Zhang et al., 2013). Given that teachers' questioning practices shape the classroom language environment (and thus students' opportunities for high-quality discussions), research is needed that examines how middle school teachers use questioning practices throughout the academic year and how those questioning practices relate to their DLL students' reading comprehension.

In addition, the importance of studying older learners' reading comprehension is that their motivation and engagement support their literacy outcomes (Guthrie, Wigfield, & You, 2012; International Literacy Association, 2019; National Council of Teachers of English, 2018; Taboada Barber & Lutz Klauda, 2020). Yet, research demonstrates decreases in early adolescents' reading motivation and engagement, likely due to developmental change (e.g., increased self-awareness of reading skill in comparison to peers) and environmental change (e.g., a shift from a supportive elementary school classroom to a middle school classroom centered on competition and evaluation of academic performance; Wigfield, Gladstone, & Turci, 2016). Because motivation for and engagement in high-quality classroom discussions may support

DLLs' reading comprehension, it is important to understand the relations between these variables, particularly during the critical developmental stage of early adolescence. Thus, in the present study, we contribute to the literature describing middle school DLLs' language environments by examining teachers' questioning practices, DLLs' engagement in high-quality discussion, and DLLs' motivation to participate in classroom discussion as they relate to reading comprehension.

Teachers' questioning practices and their students' reading comprehension

The potential for a relation between teachers' questioning practices and students' reading comprehension skills is grounded in sociocultural perspectives. Sociocultural theories (Bruner, 1978; Vygotsky, 1986) state that learning is an inherently social process and that psychological tools, such as language, are a means by which high-level thinking can be taught and learned (Bodrova & Leong, 2007; Murphy, Firetto, Wei, Li, & Croninger, 2016). In particular, teachers may use high-level questions as tools to promote students' engagement in high-level thinking (Walsh & Sattes, 2015). In turn, students' engagement in high-level thinking during classroom discussion, referred to as engagement in high-quality discussion practices, may support students' high-level reading comprehension (Li et al., 2016; Murphy, Wilkinson, Soter, Hennessey, & Alexander, 2009; Murphy et al., 2017; 2018). Thus, from the sociocultural perspective, classroom discussion stands out as an ideal social context for students to practice engaging in high-level thinking skills (via high-quality discussion practices) and to internalize these high-level thinking skills that support their independent reading comprehension (Murphy et al., 2016).

Student opportunities to engage in high-quality discussion practices may be created through teachers' use of a specific type of high-level question, the authentic question. Authentic questions are open-ended questions that encourage students to think about the text beyond the

simple reporting of facts and do not have pre-specified answers (e.g., "What do you think is going to happen in the next chapter?"; Kelly, 2007; Murphy et al., 2017; Soter et al., 2006). These questions encourage students to engage in extended responses and the high-level thinking that is predictive of reading comprehension (Guthrie et al., 2012; Mercer & Littleton, 2007; Murphy et al., 2009; Murphy et al., 2017; Soter et al., 2006). Thus, there have been recommendations for teachers to engage their students with authentic questions in order to support their literacy outcomes (Murphy et al., 2009; Reznitskaya, 2012; Soter et al., 2008; Walsh & Sattes, 2015; Wilkinson, Murphy, & Binici, 2015). The reasoning behind these recommendations is that students' high-level thinking (promoted by authentic questioning), will first emerge in a social context (i.e., classroom discussion) and will then be internalized by students (Bodrova & Leong, 2007; Vygotsky, 1978).

Despite the potential of classroom discussions to promote students' high-level thinking (and thus their reading comprehension), middle school teachers report discrepancies between their expectations for classroom discussions and the way their classroom discussions turn out in reality (Meston, Phillips Galloway, & Brown McClain, 2020). That is, teachers acknowledge that classroom discussions should ideally be characterized by opportunities for student talk and high-level thinking, but teachers report that the discussions which actually occur in their classrooms incorporate student participation at only a superficial level (i.e., brief recall responses). This discrepancy may be due to middle school classrooms being heavily teacher-controlled (Eccles et al., 1993; Eccles & Roeser, 2011), and thus, students have little space to contribute to discussion. Further, research suggests that historically underserved students, like DLLs, disproportionately attend under-resourced schools and consequently receive a less rigorous curriculum than their peers who attend higher-resourced schools (Duncan & Murnane, 2011; Eberhardt, Wial, & Yee,

2020; Sharma & Lazar, 2019). In turn, DLLs may receive few opportunities to engage in the type of high-level thinking that supports reading comprehension.

Indeed, research suggests that teachers tend to ask primarily low-level, test questions--closed-ended questions with pre-specified answers that can generally be found in the text ("What is the setting of this story?"; Murphy et al., 2017; Nystrand & Gamoran, 1991). In contrast to authentic questions, which give control of the discussion to students and encourage extended student talk, test questions are low-level questions that keep student responses brief and quickly return control of the discussion to the teacher (Cazden, 2001; Murphy et al., 2017). Teachers' use of test questions have been shown to be negatively related to students' use of high-level thinking in essays (Al-Adeimi & O'Connor, 2021) and their reading comprehension (McElhone, 2012). Taken together, the body of literature on teacher questioning suggest that teachers' use of authentic questions promotes students' literacy skills, whereas asking too many test questions, potentially at the expense of authentic questions, hinders literacy growth.

While teachers' questioning practices have important implications for students' reading comprehension outcomes, much of the research on teachers' questioning has been conducted in the context of discussion interventions, which compare classroom language use pre-intervention and post-intervention (e.g., Li et al., 2016; Murphy et al., 2016; Murphy et al., 2017; Zhang et al., 2013). Thus, there is much still to be investigated in the naturalistic classroom setting (i.e., without researcher intervention). For example, research is needed to investigate whether teachers are consistent in their questioning practices or whether they change their questioning practices over time.

Stability of teacher questioning practices

Education policies often assume that teachers' quality of classroom practices is stable, that is, that they do not change over time (Goldhaber & Hansen, 2013). Yet, teachers' classroom practices may vary from lesson to lesson due to factors including the instructional grouping, the time of day, the number of adults and students present, and the type of activity (Curby et al., 2011). The level of stability (or variability) in teachers' classroom practices may also differ by the type of teacher behavior in question. For example, study findings have suggested that there is high stability in teachers' behaviors related to classroom management and classroom climate, but lower stability in teacher practices that facilitate students' high-level thinking (Curby et al., 2011; Patrick & Mantzicopoulous, 2016; Praetorius, Pauli, Reusser, Rakoczy, & Klieme, 2014).

Other findings, from studies that include a focus on language use, have suggested that there is high stability in the characteristics of teachers' classroom language use. For example, a study of 6th grade classrooms demonstrated that teachers were consistent in two features of their language use, total amount of language use and use of sophisticated vocabulary, across the school year (Gámez & Lesaux, 2015). Studies of teacher language use in elementary school have also demonstrated high stability in features of teacher language use, including teachers' number of words, mazes (i.e., repetitions, revision, and fillers in language), and sentence complexity across lessons (Hollo, Staubitz, & Chow, 2020; Hollo & Wehby, 2017). As a feature of teachers' language use, it is possible that teachers' questioning practices may also be stable over time. At the same time, as a high-level thinking practice, it is possible that teachers' questioning practices, such as authentic questions, may be variable over time. Thus, given that the types of questions teachers ask may relate differentially to students' reading comprehension outcomes, further

research is needed that examines the stability of teachers' authentic question and test question use over time.

Motivation, engagement, and reading comprehension

In addition to teachers' questioning practices, middle school students' declining motivation is an important factor to consider in investigating their reading-related behaviors, including engagement in classroom discussion (Guthrie, Wigfield, & You, 2012; International Literacy Association, 2019; National Council of Teachers of English, 2018; Taboada Barber & Lutz Klauda, 2020). Specifically, the expectancy-value theory of motivation (Eccles & Wigfield, 2002; 2020) suggests that a main motivator for engaging in academic activities is students' values. Students' values encompass their reasons for engaging in an activity, including their general value of the activity, interest in the activity, opportunity for social interaction, and extrinsic rewards for engaging in an activity (Guthrie & Wigfield, 2017; Taboada Barber & Lutz Klauda, 2020). A recent large-scale study by the National Assessment of Education Progress (NAEP) demonstrated positive relations between eighth-grade students' value for reading and their NAEP reading scores, even when controlling for gender, race/ethnicity, socioeconomic status, English Language Learner status, and Individualized Education Program status (Zhang et al., 2020). Prior studies have also demonstrated that students' value for reading is positively related to their reported engagement in reading (Kavanagh, 2019) and their reading comprehension (Anmarkrud & Bråten, 2009), including when controlling for word reading skills and text reading speed (McGeown et al., 2015).

The other motivational component of the expectancy-value theory (Eccles & Wigfield, 2002; 2020) is expectancies, such as students' self-efficacy (i.e., beliefs about their capabilities; Bandura, 2006). Previous study findings show a positive relation between students' self-efficacy

in reading and their reading outcomes (Katzir, Lesaux, & Kim, 2009; McGeown, Duncan, Griffiths, & Stothard, 2015; Usher, Li, Butz, & Rojas, 2019), even when controlling for other reading-related variables, such as word reading skills and listening comprehension (Solheim, 2011). There is a similar relation between reading self-efficacy and reading comprehension for DLLs, even those with limited English proficiency in 6th-grade (Taboada Barber et al., 2015). Thus, this set of literature suggests that, in addition to the presence of teachers' authentic questions and thus, frequent opportunities for classroom discussions (Murphy et al., 2020), students' own motivation, in particular, their value and self-efficacy, are related to their reading outcomes (Rosenzweig, Wigfield, & Eccles, 2019; Taboada Barber & Lutz Klauda, 2020). During early adolescence, a developmental period when self-consciousness is salient and peers' perceptions hold great importance (Higa-McMillan, Takishima-Lacasa, & Ramsey, 2018), DLLs' language-efficacy (i.e., beliefs about their capabilities to use language) may be a particularly important motivator for classroom discussion. Yet, because too few studies have focused on the motivational factors--such as language-efficacy--that may promote middle school DLLs' reading comprehension, we need additional research that suggests how educators can leverage DLLs' motivation for and engagement in high-quality classroom discussions to support their reading comprehension.

The present study

Thus, in the present study, we investigate how teachers' questioning practices, along with DLLs' motivation for and engagement in authentic, high-quality classroom discussions, support DLLs' reading comprehension skills. To do so, we ask the following specific research questions (RQs): 1) How can we characterize middle school teachers' use of questioning practices across the school year? 2) What is the relation between teachers' questioning practices and their DLL

students' reading comprehension? Moreover, when given the opportunity to engage in authentic discussions (i.e., provided authentic questioning), we also asked: 3) How do DLLs' motivation for and engagement in high-quality discussion practices relate to their reading comprehension?

We did not have a directional hypothesis for our first research question given the mixed findings of previous studies--some of which suggest that teachers' facilitation of students' high-level thinking changes over time (Curby et al., 2011; Patrick & Mantzicopoulous, 2016; Praetorius, et al., 2014) and others which suggest that teachers' language use is stable over time (Gámez & Lesaux, 2015; Hollo et al., 2020; Hollo & Wehby, 2017). Based on the classroom discussion literature (Guthrie et al., 2012; Mercer & Littleton, 2007; Murphy et al., 2009; Murphy et al., 2017; Soter et al., 2006), we hypothesized that teachers' use of authentic questions would be positively related to their DLL students' reading comprehension. In contrast, we hypothesized that teachers' use of test questions would not be related to students' reading comprehension. We also hypothesized that there would be between-classroom variability in teachers' questioning practices, including authentic questions, which would result in variation in students' opportunities for authentic discussion.

Given this expected variability, where some students would have the opportunity to engage in authentic discussions and others would not, our coding of high-quality discussion practices was applied only to a subsample of students from the full sample, in particular, those students who had an opportunity to participate in authentic discussions. This subsample was used for analyses regarding the relation between motivation, high-quality discussion practices, and reading comprehension. Because the reading literature demonstrates positive relations between reading motivation, reading engagement, and reading comprehension (see Guthrie, Wigfield, and You, 2012), we hypothesized that we would similarly find positive relations between motivation

to participate in classroom discussion, engagement in high-quality discussion practices, and reading comprehension.

Method

Participants

Students. Student participants were 413 sixth-graders (*mean* age at first testing session = 11.66 years old, *SD* = 0.39; male = 179, female = 234) who were enrolled in 32 mainstream English-only classrooms (each corresponding to one of 32 teacher participants). Students were included in the present study if they completed reading comprehension assessments as part of a larger study (Gámez & Lesaux, in prep). As shown in Table 1 (Part a.), the majority of students (79.4%) reported their race/ethnicity as Hispanic/Latino(a), 3.4% as Caucasian/White, 2.7% as African-American/Black, 0.5% as Asian-American, 2.9% as Other Background, 8.2% as Mixed Background, and 2.9% did not provide race/ethnicity information. Students reported their family's home language use as 75.8% "English and Spanish", 15.3% "Spanish only", 5.3% "English only", 1.4% "English, Spanish, and another language", 0.5% "English and Arabic", and 1.7% did not report their family's language use. When asked how much of each of their languages their family used at home, 44.6% of students reported that their family used "English and another language equally", 30.8% used "mostly another language", 9.9% used "only another language", 9.2% used "mostly English", and 3.4% used "only English"; Spanish was indicated as the other language for the majority of students (92.5%). Most students reported being born in the United States (93.7%), 4.4% reported being born outside of the U.S., and 1.9% did not respond to this question.

Students attended schools in the Chicagoland area serving a predominately Spanish-speaking, Latino, and low-income student body (*M* = 89.1% Latino, *SD* = 5.705, *Range* = 80%-

96%; *M* = 90.7% low-income, *SD* = 7.196, *Range* = 71%-97%). Low-income was defined as the

percentage of students who were eligible to receive free or reduced-price lunches, lived in

substitute care, or whose families received public aid. The schools implemented a Transitional

Bilingual Education (TBE) program, in which students received home language instruction (i.e.,

Spanish) with a transition to English-only instruction (see Center for Applied Linguistics, 2016

for definition of TBE). However, at the time of the study, all student participants were being

instructed in mainstream, English-speaking classrooms.

A subsample of 99 DLL students (females = 65; males = 34; *mean* age = 11.61 years old,

SD = 0.366) from 15 of the classrooms were selected for further student-level coding and

analyses of classroom discussion practices, as detailed below. To achieve a feasible sample size

for coding, we elected to code students for whom we collected audio-recordings during the first

year of data collection (n = 235). To be included in this subsample, students needed to report

speaking Spanish at home (n = 208) and have completed all assessments, including a motivation

measure (the MCD-Q described in detail below) (n = 195). The final criterion for student

inclusion in this subsample was having the opportunity to participate in a 15-minute "authentic"

classroom discussion (i.e., provided authentic questioning) (n = 99). Thus, the subsample

demographics (see Table 1, Part b.) matched the full sample demographics, including that the

majority of the students were Latino, were born in the U.S., and reported that their families spoke

both Spanish and English at home.

Table 1. Student Demographics

Characteristic	N	a. Full Sample Percentage	N	b. Subsample Percentage
Gender				
Male	179	43.3%	34	34.3%
Female	234	56.7%	65	65.7%
Race/Ethnicity				
Hispanic/Latino(a)	328	79.4%	89	89.9%
Caucasian/White	14	3.4%	1	1%
African-American/Black	11	2.7%	-	-
Asian	2	0.5%	-	-
Mixed/Other Background	46	11.1%	9	9.1%
Did not report	12	2.9%		
Languages Used in the Home				
Spanish & English	313	75.8%	88	88.9%
Spanish Only	63	15.3%	11	11.1%
English Only	22	5.3%	0	0%
English, Spanish, & "Other Language"	6	1.4%	-	-
English & Arabic	2	0.5%	-	-
Did not report	7	1.7%	-	-
Frequency of Language Use in the Home				
Only English	14	3.4%	0	0%
Mostly English	38	9.2%	6	6.1%
English & Another Language Equally	184	44.6%	54	54.5%
Mostly Another Language	127	30.8%	31	31.3%
Only Another Language	41	9.9%	8	8.1%
Did not report	9	2.2%	-	-
Born in the United States				
Yes	387	93.7%	95	96%
No	18	4.4%	4	4%
Did not report	8	1.9%	-	-

Teachers. Teacher participants in this study were 32 6th-grade English Language Arts teachers (female = 27, male = 5; *M* age = 36.531 years old, *SD* = 10.125 years). The teachers had taught, on average, 10.563 years (*SD* = 8.531 years). All teachers were instructing mainstream English-only classrooms. Three of the teachers were certified as English as a Second Language

(ESL) teachers. Nine of the 32 teachers reported that English Language Arts was their primary

certification. Most teachers had earned a reading endorsement ($n = 19$) whereas 13 had not, and

the majority of teachers had earned a graduate degree ($n = 20$), whereas 12 teachers did not have

a graduate degree. Most teachers self-reported their race/ethnicity as Caucasian/White (81.3%),

12.5% reported being Hispanic/Latino(a), and 6.3% reported being both White and

Hispanic/Latino(a). See Table 2 for teacher demographics.

Table 2. Teacher Demographics

Characteristic	N	Percentage
Gender		
Female	27	84.4%
Male	5	15.6%
Race/Ethnicity		
Caucasian/White	26	81.3%
Hispanic/Latino(a)	4	12.5%
Caucasian/White and Hispanic/Latino(a)	2	6.3%
Graduate Degree		
Yes	20	62.5%
No	12	37.5%
Language Arts Primary Certification		
Yes	9	28.1%
No	22	68.8%%
Did not report	1	3.1%
Reading Endorsement		
Yes	19	59.4%
No	13	40.6%
ESL Certification		
Yes	3	9.4%
No	29	90.6%

Measures and Materials

      Student and Teacher Demographics Surveys. The *student demographics and language*

use questionnaire gathered information about the students, including gender, age, race/ethnicity,

and home language use. Specifically, the home language use questions asked *which* language or

languages families spoke at home, and *how much* of each language families used at home.

Students responded using a Likert-scale with the responses "Only English", "Mostly English",

"English and another language equally", "Mostly another language", or "Only another language"

(DELSS Project, 2004; Duursma et al., 2007). This language use questionnaire has been

demonstrated to be reliable (Cronbach's Alpha = 0.93) and valid for a sample of fifth-grade

Spanish-English DLLs (Duursma et al., 2007). Students were also asked to report whether they

were born in the United States or another country. The *teacher demographics and teaching*

background questionnaire contained questions about teachers' demographics (e.g., age, gender,

race/ethnicity) and teaching background characteristics (i.e., number of years teaching, reading

teacher endorsement, graduate degree, English as a Second Language certification, and English

Language Arts as a primary area of certification).

   Student-Reported Motivation. Motivation to participate in classroom discussion was

assessed using the Motivation for Classroom Discussion Questionnaire (MCD-Q; Griskell,

Gámez, & Lesaux, 2020b), which is a student self-report questionnaire. The final version of the

MCD-Q used for analysis in this study consisted of 20 items that assessed five dimensions of

student motivation related to expectancies (i.e., language-efficacy) and values (i.e., general

value, interest, extrinsic motivation, and social motivation). Students responded to items (e.g., *I*

enjoy participating in class discussions) using a five-point Likert-type scale, rating each item

from "strongly disagree" (-2) to "strongly agree" (2) with a "not sure" option in the middle (0).

Mean scores of all items were calculated to create a composite motivation score, and the means

of individual subscale items were calculated to create motivation subscale scores (subscales:

language-efficacy, value, interest, extrinsic motivation, and social motivation). Scores were

interpreted as -2: low motivation to 2: high motivation, with 0 being neutral. The MCD-Q has

high internal reliability (Cronbach's Alpha = 0.842) and is a valid measure of Spanish-speaking

DLLs' classroom discussion behaviors (Griskell, Gámez, & Lesaux, 2020a; See Appendix A for

MCD-Q items).

Audio-recorders. Language Environment Analysis Digital Language Processors (LENA

DLPs; LENA Foundation, 2015), which are small, audio-recording devices that were fastened

onto lanyards, were used to capture teacher and student talk during classroom discussions.

Reading Comprehension. Students' English reading comprehension was assessed using

the Group Reading Assessment and Diagnostic Evaluation (GRADE; Williams, 2001) Level Six

Passage Comprehension subtest. This assessment contained six medium-length passages (fiction

and non-fiction texts) and 30 multiple-choice questions related to the passages. Raw scores for

the GRADE Passage Comprehension subtest were calculated as the number of items correct out

of 30. We also calculated stanine scores for the subtest, which ranged from 1-9, with a score of 5

representing "average" performance and a standard deviation of 2 (Reynolds, Altmann, & Allen,

2021). The publisher reported reliability for Fall Sixth-Grade Form A as $\alpha = 0.88$; split-half

reliability odd/even corrected = 0.94, and Spring Sixth-Grade Form B as $\alpha = 0.92$; split-half

reliability odd/even corrected = 0.96.

Procedure

Before beginning research activities, this project was approved by the researchers'

Institutional Review Board (IRB) and the schools where the research took place. Participating

teachers gave their informed consent. Participating students received parent/guardian consent

and provided their assent before participating in research activities. Students completed the

GRADE Passage Comprehension subtest (~25 minutes) during their English Language Arts class

period at the beginning of the academic year (GRADE Form A) and end of the academic year

(GRADE Form B). In addition to the assessment days, teachers and students were given audio-recorders to record their talk during their English Language Arts class period four times throughout the school year (*M* length of recording = 62.911 minutes, *SD* = 19.643 minutes, *Range* = 22.2 minutes-112.417 minutes). They were asked to engage in their lessons as they would on a typical day. When the class period finished, researchers collected and turned off the audio-recorders. The recording sessions were spaced so that classrooms were visited approximately every two months (once each quarter of the school year). At the end of the year, students completed the demographics and language use questionnaire, along with the motivation questionnaire (the MCD-Q; ~10 minutes). Teachers also completed the demographic and teaching background questionnaire at the end of the year.

Transcription. Transcripts (i.e., written representations of language; MacWhinney 2018) were created by trained transcribers for each of the teacher audio-recordings and the subsample of student audio-recordings (each transcriber passed an 86% or higher reliability test). Transcripts were formatted using the Child Language Data Exchange System (CHILDES) Codes for Human Analysis of Transcription (CHAT) conventions, which involves breaking speech into utterances (bounded by a conversational turn, pause, breath, or change in intonation; MacWhinney, 2018).

Coding teacher questioning practices. Teacher transcripts were coded using the Quality Talk Coding Manual, which included definitions of teacher questioning practices, examples of these practices, and coding rules (Murphy, Firetto, Greene, & Butler, 2017). In particular, we coded for teacher authentic questions and test questions, which were mutually exclusive, by reading the teacher transcripts and listening to the audio-recordings for context. In accordance with the coding manual (Murphy et al., 2017), authentic questions were defined as open-ended

questions which required students to think about, around, or with the text content and did not

have a prespecified answer (Soter et al., 2006). Authentic questions also included inquiries which

required high-level thinking/speculation, asked about personal experience/affect, or asked about

connections/shared classroom knowledge (Murphy et al., 2017). In contrast, test questions

included inquires which sought a specific correct answer, required recall, or did not allow

students control over the discussion (Murphy et al., 2017; Nystrand, 2002; Soter et al., 2008).

(See Figure 1). As detailed in the coding manual, if the teacher affirmed or evaluated the

students' answer to a question as being correct or incorrect (e.g., "that's right"; "not quite"), the

question was counted as a test question because the teacher was presupposing a correct answer

(Murphy et al., 2017).

We calculated totals for teachers' number of authentic questions and number of test

questions. Consistent with a prior study examining teacher discussion practices (Michener et al.,

2018), we created proportion variables for teachers' questioning practices (e.g., total number of

authentic questions/length of class period in minutes) to compare questioning practices across

teachers, given that the class periods varied in length (*M* length of recording = 62.91 minutes, *SD*

= 19.64 minutes, *Range* = 22.2 minutes-112.42 minutes). These proportion variables were used

for analyses.

Figure 1. Examples of Authentic Questions and Test Questions

Question Code	Description	Examples of Questions
Authentic Question	Open-ended question; does not have one correct answer	"What do we think is going to happen?" "Do you think it was a good idea?" "How would you imagine the family is feeling?"
Test Question	Question which seeks a specific answer; answer can usually be found in the text	"What is the main idea?" "What is Tree Ear's goal?" "What does renewable mean?"

Coding student high-quality discussion practices. The student subsample of audio-recordings was coded for high-quality discussion practices used during authentic classroom discussions (i.e., provided authentic questioning). Student discussion segments were coded for high-quality discussion practices using a 'quality of verbal engagement' coding scheme (see Table 3; Young, 2014; Young & Mohr, 2018; Young & Murphy, 2021). This coding scheme is based on the three-story intellect model, which describes three increasingly challenging levels of thinking about text (Costa & Kallick, 2000). Each student contribution to discussion (in this case an utterance) was assigned a score of 1, 2, or 3, where a higher score indicates a higher-quality contribution to discussion. A score of 1 is at the "input level", which requires recall of text information (e.g., recall, reread, state). Scores of 2 and 3 require high-level thinking from students. Specifically, a score of 2 is at the "process" level (e.g., compare, explain, infer), and level 3 is at the "output" level (e.g., generalize, imagine, speculate). Contributions that were only acknowledging another student's comment (e.g., yeah, oh) or were not related to the discussion (e.g., singing) were not scored. We coded a 15-minute segment of discussion for each student in the subsample (99 students) to gain a measure of their discussion practices for a total of 1,485

minutes of audio coded. (See Figure 2 for example scoring). Because utterances were

infrequently scored with a "2" or "3", we combined these "high-quality" categories. Thus, a total

high-quality discussion practices score was calculated as the number of high-quality utterances

(i.e., utterances scored 2 or 3) produced during the 15-minute segment.

Table 3. Student Discussion Coding Scheme (Young, 2014; Young & Mohr, 2018)

Score	Level	Descriptors
1	Input	Name, Recall, Restate, Reread, Locate, Describe, State, Inform, Define, Identify, List
2	Process	Compare, Contrast, Classify, Distinguish, Explain (Why), Infer, Sequence, Analyze, Synthesize, Make Analogies, Reason
3	Output	Evaluate, Generalize, Imagine, Judge, Predict, Speculate, If/Then, Apply a Principle, Hypothesize, Forecast, Idealize

Figure 2. Coded Example of Discussion

it's sorta like in the back where it says that they're gonna cross the border [locate = 1]
and it says here that they saw a flashlight through the crack remaining open [reread = 1]
and that they would hold their breath in terror because they were in the boxcar [reread = 1]
so I'm guessing they're trying to cross the border now [infer = 2]
they're sorta trapped in the boxcar [state = 1]
and I'm guessing a bunch of guards are gonna check it [infer = 2]

Because teachers and students were asked to proceed with class as usual, the audio-

recorded discussions varied in length. To compare discussion practices across students, we

required that students had at least 15 consecutive minutes of opportunity for authentic discussion

to be included in this study. We chose to code 15 minutes of discussion for each student because

most teachers switched to a new activity after this amount of time. Thus, choosing periods of 15

minutes to code maximized the amount of discussion time we could code and still compare

across many students. This 15-minute segment is also consistent with the length of discussions in

prior student discourse studies (Li et al., 2016; Murphy et al., 2018; Young, 2014; Young &

Mohr, 2016). We also chose to code consecutive minutes of discussion (as opposed to combining segments of discussion throughout the recording) to code within the same classroom activity.

To facilitate identifying segments of authentic classroom discussions in student audio-recordings, we first annotated one audio-recording per classroom. Specifically, we listened to the audio-recordings to identify episodes of instruction, which were bounded by shifts in topic or activity (Michener et al., 2018; Nystrand et al., 2003). The beginning and end of activities were marked using teachers' verbal cues. For example, the teacher might begin an activity by asking students to get into their reading groups and might end the activity by telling students to take out their materials for a new activity. Researchers' brief descriptions of the episodes were also used to identify times when students were engaging in authentic classroom discussions. For example, some authentic discussion topics included producing claims and evidence from a story, identifying story themes, sharing opinions of an article about teen sleep patterns, thinking from a character's point of view, and debating whether villains can be heroic. In contrast, classrooms where students were participating in a series of brief (e.g., 3 minute) test question exchanges or other non-discussion activities (e.g., read aloud, writing) were excluded from this in-depth coding.

Analysis Plan

We conducted classroom-level and student-level analyses using two different approaches. Given that Hierarchical Linear Modeling (HLM; Raudenbush & Bryk, 2002) allows for the nesting of time (Level-1) within teachers (Level-2) and the nesting of students (Level-1) within teachers (Level-2), we relied on HLM to address our two classroom-level research questions: RQ 1) *How can we characterize middle school teachers' use of questioning practices across the school year?* and RQ 2) *What is the relation between teachers' questioning practices and their*

DLL students' reading comprehension? Specifically, we built 2-level HLM models to examine whether there was change in teachers' questioning practices (Level 2) over time (Level 1), and whether there were classroom-level (Level 2) effects on individual student-level (Level 1) outcomes. Mixed-effects linear regression models (in R, using the lme4 function; Bates, Mächler, & Bolker, 2015; R Core Team, 2021) were used to answer our individual student-level research question: RQ 3) *How does DLLs' motivation for and engagement in high-quality discussion practices relate to their reading comprehension?* Specifically, we used mixed-effects linear regression modeling to examine the relation between individual student-level variables, while controlling for student clustering by classroom. We present our results below, first for the full study classroom sample (n = 32 classrooms) that was used to investigate teacher questioning practices (RQs #1 and #2) and for the student sub-sample (n = 99 students) that was coded for high-quality discussion practices during authentic discussions (RQ #3).

Results

Full Classroom-Level Sample Results: RQs #1 and #2

Descriptive statistics. Table 4 shows descriptive results for teacher questioning practices, presented as teacher questions per minute. On average, teachers asked ~1 authentic question every 3 minutes. In contrast, teachers asked almost 3 test questions in 3 minutes. These results show that teachers asked test questions more frequently than authentic questions. In fact, in some classrooms (n = 6), no authentic questions were asked.

Table 4. Descriptive Statistics for Teacher Questioning Practices

	Mean	SD	Minimum	Maximum
Authentic Questions	0.349	0.488	0	2.533
Test Questions	0.950	0.639	0.061	2.315

Note. Authentic question and test question scores are presented as teacher questions per minute.

A paired samples t-test revealed a significant increase in students' reading comprehension scores from the fall ($M = 14.964$, $SD = 6.407$) to the spring ($M = 16.254$, $SD = 6.914$), $t(412) = 4.473$, $p < 0.001$. Table 5 (part a) shows that scores at both time points (fall, spring) were within the 4th stanine. This indicates that students' reading comprehension scores were just below average (i.e., 5th stanine) for what is expected in 6th-grade.

Table 5. Descriptive Statistics for Students: High Quality Discussion Practices and Reading Comprehension Assessments

	a. Mean	SD	Min	Max	b. Mean	SD	Min	Max
Fall Reading Comp.	14.964	6.407	2	29	15.667	5.801	2	29
Spring Reading Comp.	16.254	6.914	1	30	17.182	6.290	3	30
High Quality Discussion Practices	-	-	-	-	1.848	2.981	0	14

Note. High-quality discussion practices were scores representing the total of number of high-quality utterances (i.e., utterances scored 2 or 3) students produced during 15 minutes of authentic discussion; Reading comprehension fall and spring are scores out of 30 possible questions correct, both of which fell in the 4th stanine just below average (i.e., 5th stanine).

Precursor to main analyses. Before addressing our main research questions, we conducted precursor analyses to examine relations between teacher background characteristics (i.e., number of years teaching, graduate degree, English Language Arts as primary certification, and reading teacher endorsement), teacher questioning practices, and student reading comprehension using separate regression analyses. Results of a regression analysis showed a significant and positive relation between teachers' number of years teaching and their classrooms' end-of-the-year reading comprehension scores ($B = 0.195$, $p = 0.002$), such that teachers who had been teaching for a greater number of years had classrooms with higher end-of-the-year reading comprehension scores. No other statically significant relations were found

(p's > 0.05). Specifically, separate regression analyses showed no statistically significant relation between teachers' number of years teaching and their own frequency of authentic question use or test question use during the school year (p's > 0.05). Separate regression models also showed that there was no statistically significant relation between teachers' mean frequency of authentic question use during the school year and students' end-of-the-year reading comprehension (p > 0.05). There was also no statistically significant relation between teachers' mean frequency of test question use during the school year and end-of-the-year reading comprehension (p > 0.05).

We used separate independent t-tests to examine whether there were differences in classroom end-of-the-year reading comprehension scores as a function of teacher background characteristics. Results of these separate independent t-tests demonstrated that there were no statistically significant differences in classroom end-of-the-year reading comprehension scores as a function of the teacher having a graduate degree, having English Language Arts as a primary area of certification, or having a reading teacher endorsement (p's > 0.05). We also used separate independent t-tests to examine whether there were differences in teachers' questioning practices as a function of the teacher background characteristics. Results demonstrated that there were no statistically significant differences in teachers' mean frequency of authentic question use during the school year or teachers' mean frequency of test question use during the school year as a function of teacher background characteristics (i.e., having a graduate degree, having English Language Arts as a primary area of certification, or having a reading teacher endorsement) (p's > 0.05).

RQ #1 Main analysis: Teachers' questioning practices over time. As noted, HLM (Raudenbush & Bryk, 2002) models were built to address the research question of whether teachers' questioning practices were stable across the school year. The dependent variables,

examined in two separate growth models, were teacher authentic questions and test questions. Both of the unconditional models estimating growth in authentic questions and test questions, with Time entered as a Level-1 predictor, showed that there were no significant differences in teachers' questioning practices over the school year (p's > 0.05). These results did not change when controlling for classrooms' beginning-of-the-year reading comprehension scores (p's > 0.05). They also did not change when controlling for teacher background characteristics, including number of years teaching, English Language Arts as a primary area of certification, graduate degree, or reading teacher endorsement (p's > 0.05).

RQ #2 Main analysis: Questioning and DLLs' reading comprehension. Hierarchical linear modeling (HLM; Raudenbush & Bryk, 2002) was also used to address the research question examining the relation between teacher questioning practices and students' reading comprehension. The outcome variable in this analysis was students' end-of-the-year reading comprehension score, and teachers' questioning practices at Time 1 was our main predictor variable.

A fully unconditional model, where student end-of-the-year reading comprehension was the outcome variable, demonstrated significant Level-1 intercepts ($x^2 = 80.852$, $p < 0.001$, $ICC = 0.11$), which indicated the presence of a Level-2 classroom effect. Thus, we built a model including teacher questioning practices (i.e., authentic questions and test questions) at Level-2. We also added individual students' beginning-of-the-year reading comprehension scores as a control variable at Level-1. All variables were entered as grand mean centered. Thus, the HLM model built was:

Level-1 Model: *End-of-the-Year Reading Comprehension $_{ij}$ = β_{0j} + β_{1j}*(Beginning-of-the-Year Reading Comprehension $_{ij}$) + r_{ij}*

Level-2 Model: $\beta_{0j} = \gamma_{00} + \gamma_{01}*(Authentic\ Questions\ _j) + \gamma_{02}*(Test\ Questions\ _j) + u_{0j}$
$\beta_{1j} = \gamma_{10}$

Mixed Model: *End-of-the-Year Reading Comprehension* $_{ij}$ = γ_{00} + $\gamma_{01}*$(*Authentic Questions* $_j$) + $\gamma_{02}*$(*Test Questions* $_j$) + $\gamma_{10}*$(*Beginning-of-the-Year Reading Comprehension* $_{ij}$)+ u_{0j}+ r_{ij}

As demonstrated in Table 6, results indicated that teachers' authentic question use was significantly and positively related to students' end-of-the-year reading comprehension (*Coeff* = 1.865; *SE* = 0.774; *T-ratio* = 2.412; *p* = 0.022). For every 1 authentic question a teacher asked per minute, students' end-of-the-year reading comprehension scores were expected to increase by 1.865 points. Teachers' test question use was not significantly related to students' reading comprehension (*p* > 0.05). Our student-level control variable, beginning-of-the-year reading comprehension, was also significant and positive, indicating that students who had a high reading comprehension score at the beginning of the year also had a high reading comprehension score at the end of the year (*Coeff* = 0.672; *SE* = 0.043; *T-ratio* = 15.656; *p* < 0.001). Specifically, for every 1-point increase in students' reading comprehension scores at the beginning of the year, their end-of-the-year reading comprehension scores were expected to increase by 0.672 points.

To improve interpretability of effects across variables, we also standardized regression coefficients by multiplying each predictor coefficient by the standard deviation of the predictor variable (X) and dividing by the standard deviation of our outcome variable, end-of-the-year reading comprehension (Y) (Snijders and Bosker, 2012; Lorah, 2018). This allowed us to determine the standard deviation increase in end-of-the-year reading comprehension scores for a 1 standard deviation increase in each statistically significant predictor variable, while controlling for all other variables. Specifically, a 1 standard deviation increase in teachers' authentic questions per minute was associated with a 0.132 standard deviation increase in students' end-of-

the-year reading comprehension. A 1 standard deviation increase in students' beginning-of-the-year reading comprehension was associated with a 0.623 standard deviation increase in students' end-of-the-year reading comprehension. See Table 6 for a comparison of the Unconditional Model and Full Model.

Also of note, additional level-2 variables (i.e., teacher number of years teaching, English Language Arts as a primary area of certification, graduate degree, and reading teacher endorsement) were also tested as part of modeling. However, none of these variables were statistically significant (p's > 0.05) and controlling for these variables did not change the pattern of results. Thus, these variables were not retained in the full model.

Table 6. Comparison of HLM Unconditional Model and Full Model

Final estimation of fixed effects	(a) Unconditional model			(b) Full model		
	Coefficient	SE	T-ratio	Coefficient	SE	T-ratio
Intercept	16.150***	0.530	30.451	16.261***	0.356	45.714
Authentic questions				1.866*	0.774	2.412
Test questions				-0.343	0.581	-0.590
Beginning-of-the-year reading comprehension				0.672***	0.043	15.656
Deviance	2751.431			2558.135		
Final estimation of random effects	Variance components			Variance components		
Intercept	5.50; $df = 31$, $\chi^2 = 80.852$***			1.749; $df = 29$, $\chi^2 = 53.183$**		
Level-1	42.762			27.618		

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Unstandardized coefficients are presented; Authentic questions and test questions were entered as Level-2 (classroom level) predictors; Beginning-of-the-Year reading comprehension was entered as a Level-1 (student level) predictor.

Subsample Student-Level Analyses: RQ #3

  Descriptive statistics. In addition to the full sample descriptive statistics, Table 5 (Part b) also shows descriptive statistics for the subsample of DLL students in terms of their English reading comprehension scores and high-quality discussion practices. As with the full sample, the mean reading comprehension scores at the beginning of the year and the end of the year were both within the 4th stanine, which indicates that these scores were just below average (i.e., 5th stanine) for what is expected in 6th-grade. Specifically, results showed that students' mean reading comprehension score at the beginning of the year was 15.667 (SD = 5.801, $Range$ = 2-29) out of 30 possible points. Students' mean reading comprehension score at the end of the year was 17.182 (SD = 6.290, $Range$ = 3-30) out of 30 possible points.

  Descriptive analyses for high-quality discussion practices, shown in Table 5 Part b, indicated that, on average, students produced 1.848 high-quality utterances (SD = 2.981, $Range$ = 0-14) during a 15-minute discussion. Table 7 shows results for students' motivation scores (on a scale of -2: low motivation to 2: high motivation, with 0 as a midpoint). Descriptive statistics demonstrated that, on average, both students' composite motivation scores and their motivation subscale scores were above 0, which suggests that students reported, on average, being motivated to participate in classroom discussion.

Table 7. Descriptive Statistics for Student Subsample: Motivation for Classroom Discussion

	Mean	SD	Minimum	Maximum
Composite Score	0.773	0.594	-1.10	1.85
Value	1.091	0.612	-1	2
Language-efficacy	0.444	0.899	-1.8	2
Extrinsic	0.896	0.875	-2	2
Interest	1.064	0.783	-1	2
Social	0.475	0.789	-2	2

Note. Motivation scores ranged from -2 (low motivation) to 2 (high motivation) with 0 as a midpoint

Precursor to main analyses. We built a mixed-effects multiple regression model to examine the relation between DLLs' high-quality discussion practices and English reading comprehension, including teacher as a clustering variable. The control variable, beginning-of-the-year English reading comprehension, was also added to the model. As Table 8 demonstrates, there was not a statistically significant relation between DLLs' high-quality discussion practices and their end-of-the-year reading comprehension ($B = 0.136$, $p = 0.449$), when controlling for beginning-of-the-year reading comprehension. Beginning-of-the-year reading comprehension was a significant and positive predictor of end-of-the-year reading comprehension ($B = 0.621$, $p < 0.001$).

Table 8. Multiple Regression Model Predicting End-of-the-Year English Reading Comprehension

Parameter Estimates	B	SE	t-value	p
Intercept	7.202*	1.489	4.836	< 0.001
High-Quality Discussion	0.136	0.179	0.760	0.449
Beginning-of-the-Year Reading Comp	0.621*	0.092	6.747	< 0.001

Note. *$p < 0.05$

We built another mixed-effects multiple regression model to examine the relation between motivation to participate in classroom discussion (i.e., the composite motivation score) and high-quality discussion practices, with teacher as the clustering variable and beginning-of-the-year reading comprehension as a control variable. As Table 9 shows, the relation between the motivation composite score and high-quality discussion practices, while controlling for beginning-of-the-year reading comprehension, was not statistically significant ($p > 0.05$). However, the relation was trending in a positive direction ($B = 0.902$, $p = 0.067$), which suggested that one of the motivation dimensions may be a significant predictor of high-quality discussion practices.

Table 9. Multiple Regression Model Using Motivation Composite Score to Predict High-Quality Discussion Practices with Reading Comprehension Control

Parameter Estimates	B	SE	t-value	p
Intercept	-3.502	1.998	-1.752	0.083
Motivation Composite	0.902	0.488	1.850	0.067
Beginning-of-the-Year Reading Comp.	0.124*	0.050	2.487	0.015

Note. *$p < 0.05$

Given that prior studies of motivation demonstrated the predictive validity of students' self-efficacy as it relates to students' language use and reading (Griskell et al., 2020b; Proctor, Daley, Louick, Leider, & Gardner, 2014; Taboada Barber et al., 2015), we built another model with language-efficacy as our motivation variable. As Table 10 shows, there was a significant and positive relation between DLLs' language-efficacy and their high-quality discussion practices, even while controlling for beginning-of-the-year reading comprehension ($B = 0.669$, $p = 0.042$). Beginning-of-the-year reading comprehension was also significantly and positively related to high-quality discussion practices ($B = 0.113$, $p = 0.026$).

Table 10. Multiple Regression Model Using Language-efficacy to Predict High-Quality

Discussion Practices with Beginning-of-the-Year Reading Comprehension Control

Parameter Estimates	B	SE	t-value	p
Intercept	-2.229	1.31	-1.705	0.092
Language-efficacy	0.669*	0.324	2.066	0.042
Beginning-of-the-Year Reading Comp.	0.113*	0.050	2.258	0.026

Note. $*p < 0.05$

RQ #3 Main analysis: Motivation, discussion practices, and reading. We then used

mixed-effects multiple regression modeling to examine the relation between language-efficacy

(as our motivation variable), high-quality discussion practices, and reading comprehension, with

teacher as the clustering variable. Given the positive relation between language-efficacy and

high-quality discussion practices, we included these as an interaction term (Language-

efficacy*High-quality discussion practices). We also included beginning-of-the-year reading

comprehension as a control. Results demonstrated that there was a significant and positive

interaction between language-efficacy and high-quality discussion practices in predicting reading

comprehension, ($B = 0.421$, $p = 0.025$), such that DLLs who had high language-efficacy and

used greater amounts of high-quality discussion practices, in turn, had higher reading

comprehension than those who had low language-efficacy and lower amounts of high-quality

discussion practices (See Table 11). Beginning-of-the-year reading comprehension was

significant and positive in this model ($B = 0.643$, $p < 0.001$). This final model (with the

interaction) was better fitting than the null-model and the main-effects only model (See Table

12).

Table 11. Multiple Regression Model Using Language-efficacy and High-Quality Discussion Practices Interaction to Predict Reading Comprehension, with Beginning-of-the-Year Reading Comprehension Control

Parameter Estimates	B	SE	t-value	p
Intercept	13.226*	2.578	5.131	< 0.001
Language-efficacy	-1.899*	0.677	-2.805	0.006
High-Quality Discussion Practices	-1.356	0.707	-1.918	0.058
Lang-Efficacy*High-Quality	0.421*	0.184	2.280	0.025
Beginning-of-the-Year Reading Comp.	0.643*	0.089	7.195	< 0.001

Note. *$p < 0.05$

Table 12. Final Model Compared to Null Model and Main Effects-Only Model

Model	Deviance	AIC	df	p
Final Model (with Interaction)	2303.9	604.53		
Comparison to Null Model	3876.7*	648.04	4	< 0.001
Comparison to Main-effects only model	2431.3*	607.85	1	0.023

Note. *$p < 0.05$

To probe the significant Language-Efficacy*High-Quality Discussion Practices interaction, we used the PROCESS V. 3.5 macro for SPSS (Hayes, 2018) which allowed us to assess the impact of DLLs' high-quality discussion practices at specific values of language-efficacy. Specifically, we used the Johnson-Neyman Test to determine the region of significance for the interaction. Results indicated that the interaction was significant at the high end of the language-efficacy scale, specifically at language-efficacy scores above 4.140 (p's < 0.05). We then investigated the change in simple slopes within this region of significance. We found that as language-efficacy increased from 4.240 to 5, the slope relating DLLs' high-quality discussion practices to reading comprehension increased from 0.427 to 0.746. That is, the reading comprehension gap between DLLs who have high language-efficacy and DLLs who have low

language-efficacy is larger for higher values of high-quality discussion practices than it is for lower values of high-quality discussion practices. Thus, when DLLs use more high-quality discussion practices, the reading comprehension gap between DLLs who have high-language efficacy and low language-efficacy is expected to increase.

Discussion

The low literacy rates of early adolescents in the United States have been stagnant for decades (NAEP, 2019). Research suggests that early adolescents' reading comprehension skills can be improved through exposure to high-quality language environments (Gámez, 2020; Gámez & Lesaux, 2015; Proctor et al., 2020). The classroom language environment, in particular, may be an important context for Dual Language Learners (DLLs), who speak a non-English language at home (Office of Early Childhood Development, 2020), to develop English reading comprehension skills. Specifically, features of the classroom environment that promote high-level thinking, such as teachers' high-level questioning practices, may play a critical role in supporting the reading comprehension outcomes of early adolescents (Murphy et al., 2017; 2018). Because teachers' questioning practices can have important implications for early-adolescent DLLs' literacy outcomes, research is needed to examine how teachers use questioning practices throughout the academic year and to investigate how questioning practices in the middle school classroom are related to DLL students' reading comprehension.

In addition to teachers' questioning practices, research has suggested that motivation and engagement are important determiners of older students' reading-related behaviors and outcomes (International Literacy Association, 2019; Taboada Barber & Lutz Klauda, 2020). Yet, early adolescence is characterized as a developmental period where students experience low motivation for and engagement in literacy-related activities (Wigfield, Gladstone, & Turci,

2016). For this reason, it is important to understand how DLLs' motivation for and engagement in reading-related activities, like classroom discussion, may relate to their reading comprehension. Thus, in the present study, we examined 1) the stability in teachers' questioning practices across the academic year, 2) the relation between teachers' questioning practices and their DLL students' reading comprehension, and 3) the relation between DLLs' motivation for and engagement in high-quality classroom discussions and their reading comprehension.

Teacher questioning practices and student reading comprehension

One of our main research questions examined the relation between teachers' questioning practices and their students' reading comprehension. Our findings demonstrated that teachers' authentic (open-ended) question use was significantly and positively related to their DLL students' end-of-the-year reading comprehension, even when controlling for individual students' beginning-of-the-year reading comprehension scores and teacher test (closed-ended) question use (which was not statistically significant). These findings support the idea that teachers' use of authentic questions gives DLL students the opportunity to engage in extended dialogue and high-level thinking about text, which may facilitate the development of their reading comprehension skills (Murphy et al., 2009; Murphy et al., 2017; Soter et al., 2006).

Despite the finding that teachers' authentic questions were related to DLLs' reading comprehension, our results indicated that teachers were approximately three times more likely to use test questions than authentic questions and that these teacher behaviors were consistent over time. The finding, of teachers using more test questions that authentic questions, is consistent with the previous literature, which suggests that middle school classroom environments predominately teacher-controlled and leave little space for extended student talk (Eccles et al., 1993; Eccles & Roeser, 2011). Also, in line with the results from other studies of teacher

language use (Gámez & Lesaux, 2015; Hollo et al., 2020; Hollo & Wehby, 2017), our results

demonstrated that teachers were stable in their use of authentic questions and test questions

across the school year. This result, of stability in teachers' questioning practices, suggests that

teachers are consistent in the type of classroom language environment that they provide their

students over time. That is, they either consistently offer a language environment characterized

by authentic questions (and thus opportunities for authentic discussion), or they consistently

offer a classroom language environment characterized by test questions (and thus few

opportunities for student discussion).

However, it is important to note that our finding of stability in teachers' questioning

practices over time does not necessarily mean that teachers' questioning practices are

unchangeable. In fact, a prior classroom discussion intervention study, which provided teachers

with professional development and coaching, was successful in increasing teachers' authentic

question use and decreasing their test question use (Murphy et al., 2018). Other researchers have

also had success in altering teachers' classroom discussion practices through interventions and

professional development (see O'Connor & Michaels, 2019). Thus, educating teachers about the

importance of authentic questions and helping them to reflect on their own questioning practices

may be an important way to create higher-quality classroom language environments that support

DLLs' reading comprehension.

Motivation, high-quality discussion practices, and reading comprehension

Indeed, when given the opportunity to engage in an authentic discussion environment,

our results demonstrated that there was a significant and positive relation between DLLs' high-

quality discussion practices and their end-of-the-year reading comprehension as a function of

their language-efficacy (i.e., beliefs about their capabilities to use language). That is, the higher

DLLs' language-efficacy was, the more positive effect there was of their high-quality discussion practices on their reading comprehension. Also of note, DLLs' high-quality discussion practices, in the absence of language-efficacy, was not statistically significant in predicting DLLs' end-of-the-year reading comprehension, while controlling for beginning-of-the-year reading comprehension. These findings point to language-efficacy as a critical component of motivation in predicting middle school DLLs' reading comprehension.

This finding, demonstrating the importance of language-efficacy for engagement in classroom discussion, is consistent with a previous study of sixth-grade students, which demonstrated an interaction between language-efficacy and language status (DLL or English monolingual) in predicting students' amount of talk during classroom discussion (Griskell et al., 2020b). That is, Griskell and colleagues' (2020b) study demonstrated that students who had high language-efficacy and were English monolinguals were more likely to have greater amounts of talk during classroom discussion than students who had low language-efficacy and were DLLs. The present study contributes to the literature by exploring not only language-efficacy and engagement in classroom discussion, but also how these two constructs related to reading comprehension. To our best knowledge, this relation, between language-efficacy, engagement in classroom discussion, and reading comprehension, has not been explored yet in prior studies. In addition, our present study contributes to the literature by examining these constructs within a sample of DLLs (instead of comparing DLLs to English monolinguals). Our study results, which demonstrate that individual differences in DLLs' language-efficacy and high-quality discussion practices are predictive of their reading comprehension, suggest that it is important for future studies to continue examining the individual differences within the heterogenous group of DLLs that may support their literacy outcomes.

Limitations and future directions

While our study findings have important implications for educators working with early-adolescent DLLs, they should be considered with study limitations in mind. First, while our study has high generalizability given our naturalistic design (i.e., audio-recording classroom discussions as they happened on a typical day), our design did not allow us to examine whether teachers' questioning practices and students' high-quality discussion practices varied as a function of the type of classroom activity or instructional grouping (e.g., whole class, partners, small group). This was beyond the scope of the present study given that not all classrooms in our study were engaging in the same activities or had the same groupings during our observations. However, many reading comprehension intervention studies feature small group discussions (Murphy et al., 2017; Proctor et al., 2020; Zhang et al., 2016). Thus, it may be important to know whether small group discussions are generally characterized by more high-quality discussion practices than other types of instructional groupings, or if specific types of activities are characterized by greater amounts of high-quality discussion practices than others. This information could help teachers design classrooms that are more facilitative of high-quality discussions.

Our study also examined teachers' questioning practices and student discussion in one content area, English Language Arts (ELA). We chose to focus on ELA classrooms given that ELA has the most explicit focus on students' language and reading comprehension development. However, research has demonstrated that teachers' questioning practices and students' high-quality discussion practices may also be important for learning outcomes in other content areas, such as science and mathematics (Aziza, 2018; Chen, Hand, & Norton-Meier, 2016; Murphy et al., 2020). Thus, future studies are needed that examine how teachers' questioning practices may

promote language learning, reading comprehension, and subject knowledge in other content areas.

Despite these limitations, our study suggests that encouraging teachers to ask more authentic questions may be a promising way to promote middle school DLLs' reading comprehension skills. In addition, creating a supportive classroom environment that facilitates DLLs' language-efficacy and allows students the space to engage in high-quality discussion practices may contribute to their reading comprehension. Thus, through providing middle school DLLs with the opportunity to engage in high-quality language environments, we may support their positive literacy outcomes.

CHAPTER THREE

STUDY 2: BILINGUAL LANGUAGE SKILLS AND EARLY-ADOLESCENT DUAL

LANGUAGE LEARNERS' READING COMPREHENSION

Adolescents' reading comprehension skills have implications for a wide range of

academic and life outcomes. For example, adolescents' reading comprehension skills are

positively related to their likelihood of graduating high school and enrolling in college (Lesnick,

Goerge, Smithgall, & Gwynne, 2010). Subsequently, individuals with stronger reading

comprehension skills are more likely to gain full-time employment and have higher overall life

satisfaction than those with lower reading comprehension (see Mulcahy, Bernardes, & Baars,

2016 for review). Given these associations between reading comprehension and future success, it

is critical to identify the language-related strengths that adolescents can leverage in support of

their reading comprehension skills.

A fundamental strength of a large segment of the United States public school population,

Spanish-English Dual Language Learners (DLLs), is that they possess language skills not only in

English, but in their home language, Spanish (U.S. Department of Health and Human Services,

2020). Bilingualism theories, including the Linguistic Interdependence Hypothesis (Cummins,

1991), suggest that DLLs' Spanish language skills support their English language skills,

including English reading comprehension. Specifically, this hypothesis (Cummins, 1991) states

that a bilingual's two languages rely on a common underlying proficiency, such that conceptual

understanding and skill in manipulating language to represent thoughts and ideas is shared between the two languages. Thus, if DLLs can use their home language (Spanish) to represent conceptual understanding and to manipulate language, their home language (Spanish) skills should transfer to their English language skills. That is, DLLs can use their knowledge of the Spanish language (e.g., conceptual understanding of words; general knowledge of sentence structure) to assist them in comprehending English text.

That is, DLLs are often academically assessed only in English, but not Spanish, thus limiting our understanding of their total linguistic knowledge. In contrast, assessing DLLs in both English and Spanish provides a more accurate overall picture of how their linguistic knowledge contributes to English reading comprehension (Phillips Galloway et al., 2020). A recent study, which included DLLs in upper elementary and middle school, indeed showed that their Spanish language skills and English language skills each made unique contributions to their English reading comprehension (Aguilar, Uccelli, & Phillips Galloway, 2020). Thus, additional research is needed that prioritizes examining early-adolescent DLLs' home language skills, together with their English language skills, as they relate to reading comprehension.

To date, most research examining DLLs' bilingual language skills and their reading outcomes have been conducted at the elementary school level (Language and Reading Research Consortium, Mesa, & Yeomans-Maldonado, 2021; see Proctor & Zhang-Wu, 2019; Relyea & Amendum, 2020). Yet, the language skills that support reading comprehension change across development (Lervag, Hulme, & Melby-Lervag, 2018). Specifically, when students are "learning to read" in early elementary school (Castles, Rastle, & Nation, 2018; Chall, 1983; Treiman, 2018), they can rely on their word reading skills to comprehend simple texts (Long, 2001). For example, students' word reading knowledge, such as knowledge of letter sounds, can facilitate

their skill in matching the sounds that they already know to the written letters in text. In contrast, the expectation in upper elementary and middle school is that students are "reading to learn" (i.e., reading to gain new ideas and knowledge), which involves knowledge of complex oral language skills (Castles, Rastle, & Nation, 2018; Chall & Jacobs, 2003; Townsend, Taboada Barber, & Carter, 2020). Given this developmental shift in the language skills that support literacy, research is needed to determine how oral language skills (in English and Spanish) may support DLLs' reading comprehension upon middle school entry (i.e., 6th grade). Thus, in the present study, we examine how early-adolescent DLLs' oral language skills, in both of their languages, relate to their English reading comprehension.

The relation between English vocabulary and English reading comprehension

Reading theories, such as the Reading Systems Framework (Perfetti & Stafura, 2014), posit that the lexicon (i.e., store of vocabulary knowledge) is an essential contributor to reading comprehension. As part of this Framework, the Lexical Quality Hypothesis (Perfetti 1992; 2007; Perfetti & Hart, 2002), argues that the quality of students' lexical (i.e., word) representations, consisting of orthographic (writing), phonological (sound), and semantic (meaning) information, supports their reading comprehension skill. Having high-quality lexical representations is thought to free up more cognitive resources to comprehend text because cognitive energy is no longer needed to understand the meaning of individual words. Instead, cognitive efforts can be used to integrate word-level meaning into a sentence, and ultimately an ongoing mental representation of text (Perfetti & Stafura, 2014). Thus, according to the Lexical Quality Hypothesis (Perfetti 1992; 2007; Perfetti & Hart, 2002), if a student has high-quality lexical representations (a high amount of orthographic, phonological, and semantic knowledge about words), that student will have strong reading comprehension skills.

Empirical research supports the Lexical Quality Hypothesis (Perfetti 1992; 2007; Perfetti & Hart, 2002), suggesting that English vocabulary knowledge is positively related to Spanish-English DLLs' English reading comprehension, including during early adolescence (Kieffer, 2012; Mancilla-Martinez & Lesaux, 2010; Proctor et al., 2012; Silverman et al., 2015). Relations between Spanish-English DLLs' English vocabulary and English reading comprehension have been demonstrated even when controlling for other language skills, including listening comprehension and story retell (Kieffer, 2012), and demographic variables, such as socioeconomic status and language background (Howard et al., 2014). Thus, the body of literature that explores the relation between DLLs' English vocabulary knowledge and English reading comprehension suggests that English vocabulary is a particularly important factor in supporting their English reading comprehension outcomes.

The relation between English syntax and English reading comprehension

Although understudied in comparison to English vocabulary skills (Gámez, 2020), English syntax skills (i.e., the awareness of and the ability to manipulate sentence structure; Mokhtari & Thompson, 2006) are essential to English reading comprehension. Previous studies of DLLs' language skills in elementary school have demonstrated that DLLs' English syntax skills are positively related to their English reading comprehension; this includes research with Spanish-English DLLs (Geva & Farnia, 2012; Proctor et al., 2017; Swanson, Rosston, Gerber, & Solari, 2008). In fact, some studies have even suggested that English syntax is a stronger predictor of English reading comprehension than vocabulary (Leider et al., 2013) or other known language-related skills, such as phonological awareness (Swanson et al., 2008).

Given that high-level academic texts in middle school generally contain sentences of greater syntactic complexity than individuals use in everyday language (Scott & Balthazar,

2010), English syntax knowledge may be particularly important for early adolescents' reading skills. Indeed, a recent study of Spanish-English DLLs' language skills in grades 4-6 showed that English academic language skills, like English syntax and academic vocabulary, were positively related to their English reading comprehension (Aguilar, Uccelli, & Phillips Galloway, 2020). However, that study (Aguilar, Uccelli, & Phillips Galloway, 2020) conceptualized "academic language" as an aggregate of multiple language skills, including vocabulary, syntax, and other academic language skills. The individual effect of English syntax on English reading comprehension was not examined separately from vocabulary and other language skills. Investigating the individual effects of language skills on English reading comprehension is important because prior research suggests differential relations between English language skills on English reading comprehension (Leider et al., 2013). Thus, additional research is needed which examines the respective contributions of English vocabulary and English syntax skills to early-adolescent DLLs' English reading comprehension.

Relations between Spanish language skills and English reading comprehension

In addition to English language skills, research has suggested that DLLs' language (vocabulary, syntax) and reading skills in the home language (i.e., Spanish) may support the development of their English language and reading skills by way of cross-linguistic transfer (Eunjung Relyea & Amendum, 2020; Phillips Galloway et al., 2020; Proctor & Zhang-Wu, 2019). The strength of this cross-linguistic (Spanish to English) transfer may depend on the language skills being examined and the strength of DLLs' Spanish language skills. In particular, the interdependence continuum (Proctor, August, Snow, & Barr, 2010) states that cross-linguistic transfer is more likely when the language skills being examined share a high degree of commonality. For example, a study conducted by Proctor and colleagues (2017) demonstrated

that while DLLs' Spanish vocabulary skills in 2nd grade were not related to their 5th grade

English reading skills, their Spanish syntax skills were positively associated with their English

reading comprehension. The authors of that study (Proctor et al., 2017) suggested that there was

transfer between Spanish syntax and English reading comprehension because, at least for simple

sentences, word ordering (i.e., syntax) is consistent across both languages. Thus, a strong

understanding of word ordering in Spanish may help DLLs understand the word ordering of

English sentences in text. In contrast, there is less commonality between Spanish vocabulary and

English vocabulary (excluding cognates), which may explain the non-significant relation of

Spanish vocabulary and English reading comprehension in that study. From the perspective of

the interdependence continuum (Proctor et al., 2010), Spanish syntax may be a more likely

predictor of early-adolescent DLLs' English reading comprehension than is Spanish vocabulary.

Yet, as noted, very few studies of DLLs' reading comprehension have included measures of

syntax to be able to substantively make this claim.

Having strong Spanish skills may also increase the likelihood that DLLs' Spanish

language skills demonstrate cross-linguistic transfer to English. Often, DLLs develop strong

Spanish language skills through receiving academic instruction in that language in addition to

English instruction (i.e., bilingual instruction; Durgunoglu, 2017). Bilingual instruction may

promote the development of DLLs' English academic language skills, like English reading

comprehension, because it not only strengthens their academic language skills in English, but

also Spanish (MacSwan et al., 2017). Indeed, studies involving DLLs with well-developed

Spanish skills have shown positive cross-linguistic relations between their Spanish and English

language skills (e.g., Howard et al., 2014; MacSwan et al., 2017). For example, a study involving

upper elementary school DLLs who had strong Spanish language experiences (i.e., 96.7% spoke

Spanish at home and 100% received Spanish language instruction) demonstrated that their

Spanish academic language skills were related to their English reading comprehension, even

when accounting for English academic language skills (Phillips Galloway et al., 2020).

Similarly, a study of bilingually-instructed DLLs' language skills, which included early

adolescents, demonstrated that students' Spanish academic language skills were related to their

English reading comprehension, when controlling for socio-economic background, English

proficiency designation, and English word reading fluency (Aguilar et al., 2020). However,

many Spanish-English DLLs in the U.S. do not have the opportunity to receive bilingual

instruction and are placed in mainstream, English-only classroom settings (Gándara & Escamilla,

2017). Thus, due to these differences in DLLs' Spanish language skills, as a function of

educational experiences and language use at home, individual DLLs vary in the strength of their

Spanish skills, ranging from strong to weak skills (Griskell, Gámez, & Lesaux, 2020; Gámez,

2020). Given this variability in language skills, it is important to consider the strength of DLLs'

Spanish skills as a key variable in research studies examining cross-linguistic transfer effects on

reading comprehension skills.

Present study

In the service of understanding how bilingual language skills support older DLLs'

reading comprehension, we examined the relations between oral language skills and English

reading comprehension skills for a group of early-adolescent DLLs, who identified as Spanish-

English bilinguals. In particular, we measured DLLs' language skills (vocabulary, syntax) in

English and Spanish in order to investigate how these skills were related to a standardized

measure of their English reading comprehension. We asked the following specific research

questions (1) "What is the relation between DLLs' English oral language skills (i.e., vocabulary,

syntax) and English reading comprehension?" and (2) "What is the relation between DLLs' Spanish oral language skills (i.e., vocabulary, syntax) and English reading comprehension?" Given the developmental shift in the importance of oral language skills for older learners' reading comprehension (Lervag, Hulme, & Melby-Lervag, 2018; Ricketts et al., 2020), we hypothesized that there would be a positive relation between English oral language skills (i.e., vocabulary and syntax) and English reading comprehension. The interdependence continuum (Proctor et al., 2010) states that cross-linguistic (Spanish to English) transfer is more likely when the language skills being examined share a high degree of commonality. Thus, we hypothesized that there would be a positive relation between Spanish syntax and English reading comprehension (because there is a high degree of commonality between sentence structures in English and Spanish), but not Spanish vocabulary and English reading comprehension (because there is lower degree of commonality between vocabulary in English and Spanish).

Method

Participants

Participants were 19 sixth-grade Spanish-English Dual Language Learners (DLLs; *mean age at first testing session* = 11.84 years old, *SD* = 0.317; males = 8; females = 11) from the Chicagoland area. As shown in Table 13, 89.5% of the students identified as Latino and 10.5% identified as being from a mixed background, including Latino. Most students reported that their families spoke both English and Spanish at home (68.4%) and 31.6% reported that their family spoke only Spanish at home. A majority of students reported speaking Spanish and English equally at home (73.7%), 15.8% spoke mostly English, 5.3% spoke mostly Spanish, and 5.3% spoke only Spanish at home.

As demonstrated in Table 14, students, on average, reported being able to speak, understand, read, and write English "well". They also reported that they could speak and understand Spanish "well" and that their reading and writing in Spanish were "average". Table 13 also shows that while all of the students were in mainstream English-only classrooms at the time of the study, 63.2% reported being bilingually instructed in the past and 36.8% were only ever instructed in English. All students reported being born in the United States.

Table 13. Student Demographics & Home Language Use

Characteristic	N	Percentage
Ethnicity		
Latino	17	89.5%
Mixed Background	2	10.5%
Family Home Language Use		
English & Spanish	13	68.4%
Spanish Only	6	31.6%
Student Home Language Use		
Only Spanish	1	5.3%
Mostly Spanish	1	5.3%
Spanish & English Equally	14	73.3%
Mostly English	3	15.8%
Only English	0	0%
Type of Instruction in Past		
Bilingual Instruction	12	63.2%
English-Only Instruction	7	36.8%

Table 14. Student Self-Reported Language Skills in Spanish and English

How well do you…	M	SD	Min	Max
Speak Spanish	4.05	0.705	3	5
Understand Spanish	4.21	0.631	3	5
Read Spanish	3.26	0.991	1	5
Write Spanish	3	1	1	5
Speak English	4.68	0.582	3	5
Understand English	4.84	0.375	4	5
Read English	4.74	0.452	4	5
Write English	4.47	0.964	1	5

Note. 5 "very well", 4 "well", 3 "average", 2 "poor", and 1 "very poorly"

Measures and Materials

Demographics and Language Background Questionnaires. A demographics questionnaire was used to collect information about the participants, including gender, age, and race/ethnicity. A language background questionnaire was used to collect information about students' home language use. For example, the questionnaire asked what language (or languages) students' families used at home and how much of each language the student used at home. Students responded using a Likert-scale "Only English", "Mostly English", "English and Spanish equally", "Mostly Spanish", or "Only Spanish". Students were asked to report how many years in the past they had been enrolled in bilingual instruction or if they had only ever been instructed in English. The questionnaire also asked students to self-report about their strength of language skills in Spanish and English. Specifically, students were asked "How well would you say that you can speak [understand, read, write] in Spanish [English]?" Students responded to these questions using a scale of 5 "very well", 4 "well", 3 "average", 2 "poor", or 1 "very poorly" (DELSS Project, 2004; Duursma et al., 2007). This language background questionnaire has been demonstrated to be reliable (Cronbach's Alpha = 0.93) and valid for a sample of fifth-grade Spanish-English DLLs (Duursma et al., 2007).

Expressive Vocabulary. English and Spanish expressive vocabulary were assessed using the Woodcock-Munoz Language Survey- Revised (Woodcock, Muñoz-Sandoval, Ruef, & Alvarado, 2005) Picture Vocabulary subtest and Vocabulario Sobre Dibujos subtest respectively. These assessments require students to verbally provide names for pictured objects that increase in difficulty. The subtests produced raw scores as the number of items correct ranging from 0-59 on the English subtest and 0-58 on the Spanish subtest, which were converted to *W*-scores. For both the English and Spanish subtests, a *W*-score of 507 is approximately the grade-equivalent for beginning of 6th grade. *W*-scores were used for analyses. The publisher reported an internal consistency reliability of .92 for 11- and 12-year-old students.

Expressive Syntax. The Formulated Sentences subtest of the Clinical Evaluation of Language Fundamentals 5 English (CELF-5; Semel, Wiig, & Secord, 2003) and its Spanish counterpart, the Formulación de Oraciones subtest of the Clinical Evaluation of Language Fundamentals 4 Spanish (CELF- 4 Spanish; Wiig, Semel, & Secord, 2006), were used as measures of English and Spanish syntax knowledge respectively. These assessments require students to verbally provide a sentence describing a picture while using a given target word (or words). Each student response is given a score of 2, 1, or 0. A score of 2 indicates that the sentence used the target word(s) in a logical, complete, meaningful, and grammatical sentence. A score of 1 is given if the target word(s) was used in a sentence but had one or two errors in syntax or semantics. A score of 0 is assigned if the target word(s) was not used, if the target word was used incorrectly, or if the target word was used correctly but the response was not about the stimulus picture. The subtests yielded raw scores that ranged from 0-48 on the English subtest and 0-52 on the Spanish subtest, and raw scores were used for analyses. Given that these subtests did not provide standard scores, we also used raw scores to produce test-age equivalent scores.

The test-age equivalent scores provided by the examiner's manual indicated that on the English subtest, the average 11-year-old was expected to receive a score of 38 and the average 12-year-old was expected to receive a score of 40. On the Spanish subtest, the average 11-year-old was expected to receive a score of 37 and the average 12-year-old was expected to receive a score of 38. The publisher reported internal consistency reliability for English Formulated Sentences ages 11-12:11 = .80-.83. Although test re-test reliability was not reported for 11-year-olds, for 8:0-9:11 year-olds r = .83 and for 12-16:11 year-olds r = .74. Split-half reliability for Spanish Formulación de Oraciones ages 11-12:11 was .83-.84 and test-re-test reliability for ages 9-12:11 was r = .72.

Reading Comprehension. Reading comprehension was assessed using the Group Reading Assessment and Diagnostic Evaluation (GRADE; Williams, 2001) Level Six Sentence Comprehension and Passage Comprehension subtests, which were combined to create a Comprehension Composite raw score out of 49 possible items as detailed in the GRADE scoring manual. We also calculated standard scores for students' Comprehension Composite, where a score of 100 represented the "average" performance at grade level with a standard deviation of 15 points. In terms of the individual subtests, the Sentence Comprehension subtest contained 19 sentences, each with a missing word represented by a blank. Students selected the missing word that best fit in the blank using a multiple-choice format. Raw scores for the GRADE Sentence Comprehension subtest were calculated as the number of items correct out of 19. Reliability for Sentence Comprehension for Fall Sixth-Grade Form A was reported by the publisher as alpha = .88; split-half reliability odd/even corrected = .94. The Passage Comprehension subtest contained six medium-length passages (fiction, non-fiction texts) with 30 multiple-choice questions related to the passages. Raw scores for the GRADE Passage Comprehension subtest were calculated as

the number of items correct out of 30. The publisher reported reliability for Fall Sixth-Grade

Form A as α = .88; split-half reliability odd/even corrected = .94.

Procedure

Project approval was received from the researchers' Institutional Review Board (IRB)

before the study took place and from the schools where data was collected. The schools where

students were recruited served predominately Latino, Spanish-speaking student bodies from low-

income backgrounds. Parents completed consent forms (and students completed assent forms)

before beginning research activities. Students completed the demographic and language use

questionnaire upon providing their assent to participate in the study. Students then participated in

3 testing sessions, which were each spaced approximately 1 week apart, to assess their language

and reading comprehension skills.

During the first testing session, students completed reading comprehension measures: the

GRADE Sentence Comprehension subtest (~10 minutes) and GRADE Passage Comprehension

subtest (~25 minutes). The GRADE Sentence Comprehension subtest was always given before

the GRADE Passage Comprehension subtest as recommended by the GRADE administration

guidelines (Williams, 2001). The researcher provided the students with instructions and allowed

them to work silently on the tasks. During the second and third testing sessions, students

completed the oral language measures: standardized vocabulary and syntax assessments

(Woodcock-Munoz Picture Vocabulary and CELF Formulated Sentences respectively). It took

approximately 15-30 minutes for each student to finish one session (i.e., vocabulary and syntax

assessments in one language). The sessions were counterbalanced by language (English or

Spanish) and the tasks within the session were counterbalanced by language component

(vocabulary or syntax). The syntax tasks were audio-recorded to ensure that students' responses

were written verbatim. Upon completion of the final task, the researcher thanked the student for participating and asked if they had any questions about the project. Each participating student was compensated with a $25 gift card at the end of the study.

Of note, the COVID-19 pandemic began while recruitment and data collection for this study were ongoing. Thus, the majority of participants ($n = 15$) were recruited from the same school district, but 4 additional students were recruited online from other districts. In addition, the original project procedures were adapted consistent with recommendations for conducting research during the COVID-19 pandemic to ensure the safety of study participants (Martin, Dericks, Guess Hofer, Lorenzo Kennedy, & Wright, 2021; Wright & Raiford, 2020; Wright, Mihura, Pade, & McCord, 2020). For example, participants used Qualtrics, a secure web-based survey research platform, to complete forms and questionnaires that had previously been completed on paper (i.e., consent forms, assent forms, demographics and language use questionnaires). Study assessments were completed via video chat (i.e., Zoom or Google Meet) with a researcher, and the testing sessions were designed to most closely approximate in-person administration (Krach, Paskiewicz, & Monk, 2020; Wright et al., 2020). Also, given the transition to remote testing, we discontinued an additional study session where students had been engaging in an in-person, small group discussion task. A little over half of the participants (n = 12) had participated in this discussion task before the pandemic started. However, because the discussion task was not completed and not all students had the opportunity to participate in this task before pandemic-related school closures, this task will not be analyzed and thus, will not be discussed here.

Analytic Plan

We analyzed the data using individual simple regression analyses, which permitted us to keep our predictor-to-participant ratio within acceptable limits (Harrell, 2015). We used this approach to answer our two research questions, (1) "What is the relation between DLLs' English oral language skills (i.e., vocabulary, syntax) and English reading comprehension?" and (2) "What is the relation between DLLs' Spanish oral language skills (i.e., vocabulary, syntax) and English reading comprehension?"

Results

Descriptive statistics. As shown in Table 15, the sample had a mean English vocabulary *W*-score of 498.790 (*SD* = 12.223, *Range* = 470-521), which is the grade-equivalent of approximately the beginning of fourth grade or age 9:11 years-old. This sample had a mean Spanish vocabulary *W*-score of 486.737 (*SD* = 14.544, *Range* = 464-517), which is the grade-equivalent of approximately middle of second grade or age 8:2 years-old. Students' mean English syntax score was 38.368 (*SD* = 5.649, *Range* = 27-48) out of 48 possible points, which is the approximate test-age equivalent of a student between 11:1 years-old and 11:7 years-old. Students' mean Spanish syntax score was 30.632 (*SD* = 7.904, *Range* = 11-43) out of 52 possible points, which is the approximate test-age equivalent of a student between 8:6 years-old and 8:11 years-old. Results for the English reading comprehension composite score demonstrated that students' mean score was 34.95 (*SD* = 9.180, *Range* = 10-47) out of 49 possible points. This mean raw score was approximately the standard score equivalent of 102, which indicated that students were performing at grade level (i.e., 100).

Table 15. Students Oral Language and Reading Comprehension Scores

Measure	Mean Score	SD	Minimum	Max
English Vocabulary	498.790	12.223	470	521
Spanish Vocabulary	486.737	14.544	464	517
English Syntax	38.368	5.649	27	48
Spanish Syntax	30.632	7.904	11	43
English Reading Comp.	34.950	9.180	10	47

Note. W-scores reported for English vocabulary and Spanish vocabulary (*W*-score of 507 is approximately the grade equivalent for beginning of 6th grade for both languages); Raw scores reported for English syntax (out of 48 possible points), Spanish syntax (out of 52 possible points), English reading comprehension is the GRADE Comprehension Composite score (out of 49 possible points)

We removed two outliers that were more than two standard deviations from the mean (*M* English vocabulary score = 498.790; *M* reading comprehension score = 34.950), one on English vocabulary and one on reading comprehension. We then conducted paired-samples t-tests to examine students' English language skills in comparison to their Spanish language skills. Results of a paired sample t-test for vocabulary revealed that students' English vocabulary scores were significantly higher (*M* = 500.882, *SD* = 10.428) than their Spanish vocabulary scores (*M* = 486.588, *SD* = 15.009), $t(16) = 2.803$, $p = 0.013$. The English and Spanish syntax measures had different numbers of items and thus different total raw score scaling, and these particular subtests do not have standard score equivalents. To compare across measures, we created mean scores across the items for each individual given that each item on both measures was scored on a scale from 0-2. Thus, we produced mean scores for both the English and Spanish syntax measures that ranged from 0-2 (instead of a summed total score). The results of the paired sample t-test for syntax, using this 0-2 scaling, revealed that students' English syntax scores were significantly higher (*M* = 1.600, *SD* = 0.259) than their Spanish syntax scores (*M* = 1.219, *SD* = 0.242), $t(16) = 4.225$, $p = 0.001$.

Pearson correlations were used to examine the relations between study variables. As demonstrated in Table 16, there was a positive and significant correlation between English vocabulary and English syntax ($r = 0.535$, $p = 0.027$). There was a positive and significant correlation between English syntax and English reading comprehension ($r = 0.608$, $p = 0.010$). There was a trend toward significance for Spanish vocabulary and Spanish syntax ($r = 0.460$, $p = 0.063$). There were no significant relations between any of the other variables (p's > 0.05).

Table 16. Correlations Between Oral Language Measures and Reading Comprehension

	English Vocab	Spanish Vocab	English Syntax	Spanish Syntax
English Vocab	----			
Spanish Vocab	-.345	----		
English Syntax	.535*	-.367	----	
Spanish Syntax	-.306	.460+	-.096	----
English Reading Comp.	.323	-.264	.608*	.114

Note. +$p < 0.1$, *$p < 0.05$, **$p < 0.01$.

English oral language skills and English reading comprehension. To answer the first research question, regarding the relation between English oral language skills and English reading comprehension, we conducted separate regression analyses. The outcome variable was English reading comprehension, and the predictor variables, English vocabulary and English syntax, were entered in separate models to ensure that our predictor-to-participant ratio was within acceptable limits (Harrell, 2015). Results demonstrated that the relation between English syntax and English reading comprehension was significant and positive ($B = 0.747$, $SE = 0.252$, $t = 2.963$, $p = 0.010$). There was no statistically significant relation between English vocabulary and English reading comprehension ($p > 0.05$).

Given that our English reading comprehension measure was comprised of two subtests— sentence comprehension and passage comprehension, we created additional separate regression

models to determine if English vocabulary was related to either of these subtests. Results demonstrated that there was a positive trend between English vocabulary and the sentence comprehension subtest ($B = 0.116$, $SE = 0.061$, $t = 1.894$, $p = 0.078$). There was no statistically significant relation between English vocabulary and the passage comprehension subtest ($B = 0.111$, $SE = 0.128$, $t = 0.871$, $p = 0.398$).

      Spanish oral language skills and English reading comprehension. To answer the second research question, regarding the relation between Spanish oral language skills and English reading comprehension, we built additional simple regression models with English reading comprehension as the outcome. The predictor variables, entered in separate models, were Spanish vocabulary and Spanish syntax. The results revealed that there was no significant relation between Spanish vocabulary and English reading comprehension or Spanish syntax and English reading comprehension (p's > 0.05). Parallel non-significant results were found when building additional regression models using the English sentence comprehension subtest and the English passage comprehension subtest as separate outcomes (p's > 0.05).

Discussion

      Adolescents' skill in reading comprehension is a strong predictor of their academic and life outcomes (Lesnick, Goerge, Smithgall, & Gwynne, 2010; Mulcahy, Bernardes, & Baars, 2016 for review). Because many U.S. adolescents struggle with literacy (NCES, 2019), it is essential to determine how their language skills can be leveraged in support of their reading comprehension. A language-related strength of a growing group of U.S. adolescents, Spanish-English Dual Language Learners (DLLs), is that they have knowledge in both English and a home language, in this case, Spanish (U.S. Department of Health and Human Services, 2020). Bilingualism theories (Cummins, 1991; Proctor et al., 2010) and emerging empirical research

(Aguilar et al., 2020; Phillips Galloway et al., 2020) suggest that early-adolescent DLLs can use their Spanish language skills to support their English language skills, like English reading comprehension. However, in the face of U.S. education policy that focuses on teaching and assessing DLLs in English (but not in their home language; de Jong, 2013), further research is needed to examine how individual Spanish oral language skills, including vocabulary and syntax, in addition to English oral language skills, support DLLs' English reading comprehension. This research into the component skills (vocabulary, syntax) that predict reading comprehension is especially important for older DLLs for whom there is limited research (Aguilar et al., 2020; Phillips Galloway et al., 2020). Thus, the objective of the present study was to examine how early-adolescent DLLs' oral language skills (i.e., vocabulary and syntax) in English and Spanish were related to their English reading comprehension.

DLLs' English language skills and English reading comprehension

The findings from our first research question, examining the relation between English oral language skills (i.e., vocabulary and syntax) and English reading comprehension in older learners, revealed a significant and positive relation between early-adolescent DLLs' English syntax and English reading comprehension. The finding of a positive relation between DLLs' English syntax and English reading comprehension is consistent with prior study findings, which have demonstrated these relations with samples in elementary school (Geva & Farnia, 2012; Proctor et al., 2017; see Proctor & Zhang-Wu, 2019 for review; Swanson, Rosston, Gerber, & Solari, 2008). In early elementary school, students can often manage comprehending text by relying on their simple word-reading skills. In middle school, however, knowledge of complex oral language skills, like syntax, becomes an essential component of reading comprehension (Castles et al., 2018; Chall & Jacobs, 2003; Townsend et al., 2020). That is, middle school level

texts are composed of syntactically complex sentences, in contrast to the simpler syntax found in elementary level texts (Scott & Balthazar, 2010). Thus, our finding, of a positive relation between English syntax and English reading comprehension, supports the idea that having strong English syntax skills supports early adolescents' skill in comprehending the more complex sentences found in middle school level texts.

In addition, our results demonstrated that there was a positive trend for English vocabulary and one component of English reading comprehension: the sentence comprehension subtest. We had hypothesized that English vocabulary would be significantly and positively related to English reading comprehension given that reading theories (Perfetti 1992; 2007; Perfetti & Hart, 2002; Perfetti & Stafura, 2014) and an extensive body of empirical literature have demonstrated the importance of English vocabulary knowledge for Spanish-English DLLs' English reading comprehension (e.g., Howard et al., 2014; Kieffer, 2012; Mancilla-Martinez & Lesaux, 2010; Proctor et al., 2012; Silverman et al., 2015). In particular, this prior literature suggests that knowledge of sophisticated vocabulary takes on greater importance as early adolescents encounter more challenging texts in middle school (Phillips Galloway & Lesaux, 2015). Thus, because the vocabulary measure used in this study is often referred to as an academic measure of vocabulary, we had expected to find that our sample's English vocabulary scores would predict their English reading comprehension in early adolescence.

It is possible that we found only a trend for English vocabulary and reading comprehension due to the small sample size in our study (N = 19) and thus, there was insufficient power to detect small effects, including for vocabulary. For instance, in a study investigating the language skills of Spanish-English DLLs, Proctor and colleagues (2012) included a sample size of 294 participants, which enabled them to detect a small effect

(standardized effect size 0.19) of English vocabulary on English reading comprehension. Thus, with a larger sample size to detect an effect, we expect that we also would have found a positive and statistically significant relation between English vocabulary and English reading comprehension.

DLLs' Spanish language skills and English reading comprehension

The findings from our second research question, examining the relation between Spanish oral language skills (i.e., vocabulary and syntax) and English reading comprehension, showed that there was no statistically significant relation between DLLs' Spanish syntax or Spanish vocabulary and their English reading comprehension. These findings, demonstrating no statistically significant relation between DLLs' Spanish oral language skills and English reading comprehension, may suggest that the Spanish language skills of some of our study participants were not strong enough to show transfer to their English reading comprehension skills. In fact, as a whole, our sample scored significantly better in English than Spanish, indicating unbalanced bilingualism.

Many our study participants attended a district with a transitional bilingual education program, where the goal of their bilingual education was English proficiency, rather than strong language skills in both English and Spanish (Center for Applied Linguistics, 2016). That is, in transitional programs students received instruction in Spanish only until they knew enough English to be transitioned into a mainstream English-only classroom. By early adolescence, most DLLs in transitional bilingual education, including the participants in our study, had transitioned to English-only instruction.

Transitional bilingual education contrasts with other types of bilingual instruction, like dual language programs, where students continue to receive instruction in Spanish for at least 5

years, alongside English, with the goal of developing DLLs' language skills in both English and

Spanish (also see Center for Applied Linguistics, 2016). Thus, a dual language program, which

continues to instruct DLLs in Spanish with the goal of developing strong skills in both

languages, is more facilitative of strong Spanish language skills and thus, cross-linguistic

(Spanish to English) transfer than transitional bilingual education, which only provides Spanish

instruction until students can be taught in English. Indeed, a study following thousands of Latino,

Spanish-English DLLs from kindergarten through high school demonstrated that, when

comparing DLLs in transitional bilingual, dual language, and English-only programs, students in

dual language programs (i.e., who continued receiving Spanish language instruction) had the best

performance in terms of English Language Arts achievement and English proficiency (Umansky

& Reardon, 2014). Thus, through offering continued academic instruction in Spanish, schools

can increase the likelihood that DLLs' will develop strong Spanish language skills, and in turn,

their Spanish skills will support their English language skills, including English reading

comprehension.

Limitations and future directions

It is important to consider these findings with study limitations in mind. As noted, one

limitation of this study is the small sample size that was due to the COVID-19 pandemic. Our

initial recruitment efforts relied entirely on visiting schools in-person, but the school closures and

social distancing mandates that were put into place during the pandemic prevented us from

continuing in-person recruitment at schools and other public locations. Thus, in attempts to

increase our sample size, we transitioned to online study recruitment, which led us to include 4

students who were outside of the target district.

The challenges of recruiting a sample of Spanish-English DLLs from low-income backgrounds during the pandemic alludes to the larger issues of equity, which may prevent some Latinos from participating in research studies—especially online studies. For instance, research demonstrates only 57% of U.S. Latinos own a home computer (Perrin & Turner, 2019), and Latinos from low-income backgrounds are less likely to use the internet than Latinos from higher-income backgrounds (Brown, López, & Hugo Lopez, 2016). These statistics suggest that access to an online study could have been limited for the target sample of Latino, Spanish-speaking families from low-income backgrounds, who may not have had access to and/or been proficient in the technology needed to participate in the study. Further, a recent special issue on COVID-19 revealed that Latino children were more likely to have experienced poverty, have parents lose jobs, and to have school closures during the pandemic than non-Latino white children (Parolin, 2021). Thus, given these additional hardships during the pandemic, Latino families were probably less likely to participate in a research study during this time.

The pandemic also presented methodological challenges in administering language and reading comprehension assessments for this study. In particular, the measures that we had been using before the start of the pandemic were designed to be administered in an in-person, face-to-face format. When there were school closures and social distancing restrictions, we had to adapt our study to administer measures remotely for the safety of the participants. Thus, there were 8 students who participated fully in-person, 4 students who started the study in-person and finished the study online, and 7 students who participated fully online. Because we had so few participants in each group, we did not explore this study confound. Thus, it is important that future research examine the relations between DLLs' oral language skills and reading comprehension when all students are able to be tested in-person.

Despite these limitations, our study contributes to the small, but growing, body of research examining the linguistic strengths of early-adolescent Spanish-English DLLs. In particular, our study highlights the need for continued research regarding the role that oral language skills (in English and Spanish) play in supporting older DLLs' English reading comprehension. Through increasing access to academic instruction in Spanish, which develops DLLs' strong Spanish oral language skills alongside English oral language skills, early-adolescent DLLs may have more positive English reading comprehension outcomes.

CHAPTER FOUR

STUDY 3: BI-LITERACY AND MOTIVATION AS PREDICTORS OF BILINGUAL

STUDENTS' TALK DURING CLASSROOM DISCUSSION

Many early adolescents in the United States experience English literacy difficulties

(NAEP, 2019). A growing subgroup of U.S. adolescents, Spanish-English bilinguals, are often at

greater risk for literacy challenges than their English monolingual peers (The Nation's Report

Card, 2017). Identifying the factors that may promote bilingual adolescents' literacy outcomes is

particularly important given the disproportionate economic and societal barriers that affect these

students (Child Trends, 2016; The Nation's Report Card, 2017). In the face of these challenges,

native Spanish language skills are one unique strength of bilingual students that may support

their positive English language outcomes (Phillips Galloway, Uccelli, Aguilar, & Barr, 2020). At

the same time, bilingual students, as a heterogeneous group, have varied language experiences,

with students being exposed to more or less Spanish and English (Gámez & Lesaux, 2015).

Consequently, they have varying levels of bi-literacy (i.e., reading and writing skills in their two

languages; Durgunoğlu, 2017). Thus, it is important to investigate the factors, including early

adolescents' bi-literacy, that may promote their positive English language outcomes.

Previous research suggests that producing language output is another critical factor that

supports the development of the school language (i.e., English). In particular, empirical studies

have shown that the amount of English language output produced by Spanish-English bilinguals

during classroom discussion is positively related to their English language and literacy outcomes (Zhang, Anderson, & Nguyen-Jahiel, 2013; Zhang, Munawar, Niu, & Anderson, 2016), including reading comprehension (Saunders & Goldenberg, 1999). Given that oral language skills are related to students' literacy skills, researchers have called for more opportunities for bilingual students to engage in oral language use in the classroom (Ossa Parra et al., 2016).

While producing language output, specifically during classroom discussion, can benefit bilinguals' English language-related skills, past research demonstrates that there are differences in the amount of talk that students produce during discussion (see Murphy, Firetto, Wei, Li, & Croninger, 2016). One factor that may be particularly important to consider in increasing bilinguals' talk during classroom discussion is motivation. Motivation is a reason for engaging in an activity, which affects an individual's choice, persistence, and effort related to that activity (Dörnyei & Ushioda, 2011). Indeed, a long line of research on literacy-related activities suggests that students' motivation is positively related to their language and literacy outcomes (Guthrie, Wigfield, & You, 2012; Taboada, Tonks, Wigfield, & Guthrie, 2009; Wigfield & Guthrie, 1997). Despite this research, little is known about the relation between bilingual students' motivation and their language use. Thus, it is important to investigate how motivation and amount of language use during classroom discussion may be related to each other.

Research, albeit primarily conducted in European countries, suggests that there may also be a positive relation between students' motivation and their bilingualism (Coyle, Hood, Marsh, 2010; Mearns, de Graaff, & Coyle, 2017). In particular, a prior study in the Netherlands demonstrated that students enrolled in bilingual education had greater language motivation than did students in mainstream education (Mearns et al., 2017). It is important to note, however, that the higher motivation of the students in bilingual education could be the result of context-specific

factors, for example, socio-economic status (SES) or language background. Indeed, students in the Netherlands, who enroll in bilingual education, in comparison to those who enroll in mainstream education, tend to be from higher SES backgrounds (Mearns et al., 2017; Sieben & van Ginderen, 2014). Due to these contextual differences, it is important that additional studies investigate the relation between bilingualism and motivation in students of other SES contexts. For example, in the U.S, 28% of Spanish-English bilinguals live in poverty, in comparison to 17% of students living in English-only households (Child Trends, 2016). Thus, in the present study, we investigate the relation between bi-literacy and motivation for Spanish-English bilinguals, specifically from low-SES backgrounds in the U.S. Additionally, as noted, we investigate how motivation to participate in discussion and bi-literacy may contribute to bilinguals' amount of talk during classroom discussion.

Bi-literacy to promote cross-linguistic benefits for English language-related skills

Theoretical accounts of bilingualism have proposed that bilinguals' native and school language skills may be bi-directionally related (MacSwan, 2017; Prevoo, Malda, Emmen, Yeniad, & Mesman, 2015), such that the development of strong language and literacy skills in a bilingual's native language should have cross-linguistic benefits for their developing school language. Yet, the strength of the relation between bilinguals' two languages are thought to depend on many factors, including the similarity between the two languages, the type of language skill, and other contextual factors (Proctor, August, Snow, & Barr, 2010). Thus, additional research is needed that investigates the factors that may relate to positive English language outcomes for Spanish-English bilinguals in the U.S.

In fact, empirical research in the areas of bilingualism and bi-literacy supports theoretical accounts, suggesting that strong native Spanish language skills may be related to a variety of

English language outcomes (Prevoo et al., 2015; Proctor, Harring, & Silverman, 2017). Importantly, bilinguals tend to experience more positive English literacy outcomes when their native language is supported, for example, when they have the opportunity to receive bi-literacy instruction (i.e. education that supports literacy skills in both the native and school language; Bialystok, 2018). For example, a recent study of early adolescents receiving bi-literacy instruction suggested that there is a positive relation between their Spanish and English academic language skills, such as understanding complex sentences and text organization (Phillips Galloway, Uccelli, Aguilar, & Barr, 2020). These same Spanish academic language skills have also been shown to be uniquely related to students' English reading comprehension skills (e.g., Phillips Galloway et al., 2020). These study results suggest that native language knowledge can have cross-linguistic benefits for the school language.

Yet, when literacy instruction occurs only in English, cross-language effects of Spanish oral language skills and reading-related skills in English are generally not found (Gottardo & Mueller, 2009; Mancilla-Martinez & Lesaux, 2010; 2017). For example, in a study by Mancilla-Martinez and Lesaux (2017), English language skills were found to be better predictors of bilingual students' English reading comprehension skills in grades 5 and 8 than their Spanish language skills. The findings of stronger within- than across-language effects were likely because the students were educated in mainstream classrooms with English-only instruction since kindergarten and in turn, did not have support for their native language skills as they progressed in school. This body of literature on cross-linguistic transfer suggests that supporting bilinguals' native language and developing their bi-literacy through bilingual instruction can help them build stronger English language and literacy skills. Thus, a more nuanced understanding of relations between bilingual language experience and English language outcomes is needed. For

example, additional research is needed to investigate how students' own perception of their bi-literacy may be related to their amount of school language use. This research would highlight a potential strength of bi-literacy in supporting development of the school language.

Motivation to promote bilinguals' talk during classroom discussion

In addition to bi-literacy, there is some empirical evidence to suggest a positive relation between students' motivation and their amount of second language use (e.g., MacIntyre, Baker, Clément, & Donovan, 2002; MacIntyre & Charos, 1996). For example, studies of middle school students and adults studying a second language (L2 French) demonstrated that their L2 motivation (i.e., reported desire to learn the L2, effort, and attitudes toward learning the L2) was positively correlated with their self-reported frequency of communication in the L2 (MacIntyre et al., 2002; MacIntyre & Charos, 1996). The frequency of communication measured in these prior studies asked individuals to self-report their amount of L2 use in a variety of contexts (i.e., dyads, small groups, formal meetings, public speaking) with a variety of interlocutors (i.e., strangers, acquaintances, friends) (MacIntyre et al., 2002; MacIntyre & Charos, 1996). Thus, studies are needed that specifically examine students' amount of actual language use in an academic setting (i.e., the language arts classroom), which may differ from their language use in non-academic contexts.

It is also important to consider the different types of motivation that students have for using language in academic settings. Specifically, the education-oriented theory of motivation (Crookes & Schmidt, 1991; Keller, 1983) and second language learning theories (Dörnyei, 1994; Dörnyei & Ushioda, 2011) propose that students' motivation for classroom-based activities stems from interest, relevance, expectancies, and satisfaction/outcomes. *Interest* relates to students' inherent curiosity. Relevance is related to whether a student feels that a task is aligned

with their *values* and personal needs, such as *social* relationships. Expectancies include students' *self-efficacy* or confidence in one's ability to complete a task, and satisfaction/outcomes include *extrinsic* rewards like praise. These dimensions of motivation, including *interest*, *value*, *social motivation*, *self-efficacy*, and *extrinsic motivation*, have been identified as being highly applicable to a classroom setting, including for second language learners (Dörnyei & Ushioda, 2011, p. 50).

Empirical research on literacy-related activities has demonstrated support for relations between *interest*, *value*, *social motivation*, *self-efficacy*, and *extrinsic motivation* and students' participation in classroom activities. In particular, middle school Spanish-English bilinguals' engagement in class is positively predicted by components of motivation such as their *efficacy* beliefs (i.e., beliefs about their abilities) and *social motivation* (i.e., relatedness to their teacher; Taboada Barber, Buehl, & Beck, 2017). *Extrinsic motivators*, like teacher praise, may also be used to promote students' engagement in literacy activities (Gambrell & Marniak, 1997). Additionally, students may be motivated to engage in activities they perceive to be important. For instance, students' reported *value* (i.e., perceived usefulness, enjoyment, or interest; Eccles, Adler, Futterman, Goff, Kaczala, Meece, & Midgley, 1983) of classroom discussion is positively related to their reported engagement in discussion (Wu et al., 2013). Students may also be motivated to participate in activities out of *interest*, an evaluative stance toward a domain that is content-specific (Schiefele, 1991). For example, a student may engage in a discussion only when interested in specific discussion content, like sports. Given this, recent curriculum recommendations include providing bilinguals with interesting texts in order to increase their desire to engage in literacy activities (see Protacio, 2012).

Additionally, the results of a prior study (Griskell, Gámez & Lesaux, 2020b) suggest that dimensions of motivation including *interest*, *value*, *social motivation*, *self-efficacy*, and *extrinsic motivation* are implicated in students' participation in classroom discussion. Specifically, when interviewed about reasons for using language during discussions, students shared comments related to these five dimensions of motivation. Motivation theories would suggest that if students have greater levels of motivation in these dimensions, they should demonstrate increased learning behaviors (Dörnyei & Ushioda, 2011), such as increased amount of language use during classroom discussion.

The present study

Given that bi-literacy skills may support bilinguals' school language skills (Phillips Galloway et al., 2020; Proctor et al., 2017) and that motivation may contribute to bilinguals' language-related behaviors (Crookes & Schmidt, 1991; Keller, 1983; MacIntyre et al., 2002), the present study examines how motivation and reported bi-literacy may predict one language-related behavior, participation in classroom discussion. Specifically, the overall objective of the present study was to examine how Spanish-English bilingual students' reported bi-literacy and motivation to participate in classroom discussion may relate to their amount of talk during classroom discussions. To that end, we ask: 1) How does motivation to participate in classroom discussion differ for bilinguals as a function of their reported bi-literacy? 2) How do motivation and bi-literacy relate to bilingual students' amount of talk during classroom discussion?

The data used for this study were drawn from a larger study investigating the consistencies and changes in the language use of sixth-grade students over one academic year (Gámez & Lesaux, in prep). As part of the larger study, sixth-graders (bilingual and monolingual) were audio-recorded during their English Language Arts (ELA) class. For the

purposes of the present study, the audio-recordings of bilingual students, who self-reported on their bilingualism and bi-literacy, were coded in terms of their amount of talk during classroom discussions. We also assessed bilingual students' self-reported motivation to participate in classroom discussion using a validated measure of motivation (the Motivation for Classroom Discussion Questionnaire; MCD-Q; Griskell et al., 2020b). In addition, students' reading comprehension skills in English were as a control variable in our main analyses regarding the relation between bilingual students' amount of talk to their motivation and self-reported bi-literacy skills.

Method

Participants

The study sample consisted of 121 sixth-grade students, (*mean* age = 12.119 years old; $SD = 0.358$) who were enrolled in 12 mainstream English-only classrooms. This was the final sample size after excluding students (original sample size = 149) who were absent during testing ($n = 21$), who were not in mainstream English classrooms ($n = 6$), or who were part of a non-target language background (i.e., Arabic; $n = 1$) from the sample. Of the students in the final sample, 119 reported speaking both Spanish and English, and 2 reported being exposed to Spanish at home and spoke English. The majority reported being born in the U.S; students who were not born in the U.S. reported moving to the U.S. when they were, on average, 3.694 years-old ($SD = 2.135$ years). See Table 17 for further sample characteristics.

Table 17. Description of the Sample

Characteristic	N
Gender	
Female	64
Male	57
Ethnicity	
Hispanic/Latino	100
Dual background/other	16
Caucasian/white	4
Asian American	1
African American/black	0
Student Home Language Use	
English & Spanish equally	51
Mostly English	36
Mostly Spanish	34
Born in the United States	
Yes	115
No	6

Participating students attended schools within a school district that serves a mostly

Spanish-speaking, Latino (47.10-80.8% Latino; $M = 65.2\%$; $SD = 13.747\%$), and low-income

student body (79.4-94.9% low income; $M = 87.4\%$; $SD = 6.032\%$), defined as receiving public

aid, living in substitute care, or eligibility to receive free or reduced-price lunch. The schools

operated under a Transitional Bilingual Education (TBE) program, in which instruction is

offered in the native language (i.e., Spanish) with a transition to English-only instruction (see

Center for Applied Linguistics, 2016 for a definition). Of the 121 students, 62 reported being

enrolled in at least one year of a bilingual education program in the past (M Years in Bilingual

Education = 2.919 years, $SD = 1.623$). Of the students who had been enrolled in bilingual

education, 35 reported being in sustained bilingual education (i.e., having three or more years of

bilingual education) in the past.

Measures

      Bi-literacy Questionnaire. A researcher-developed questionnaire was used to ask questions regarding students' reading and writing skills in Spanish and English as well as enrollment in bilingual programs. The following questions were included for both Spanish and English: "How well would you say that you can read Spanish (English)?" and "How well would you say that you can write Spanish (English)?" Students indicated their responses on a scale with the response choices: 5 "very well", 4 "well", 3 "average", 2 "poor", or 1 "very poorly". Students were also asked to indicate the years (from preschool to sixth-grade; 0 to 8 years) in which they were enrolled in bilingual education.

      Given the lack of variability in students' report of English reading and writing skills, we relied on students' self-report of their Spanish reading and writing skills to determine their bi-literacy. A Pearson correlation revealed that students' reported Spanish reading and writing skills were highly correlated ($r = 0.88$, $p < 0.001$). A Principal Components Analysis also revealed that Spanish reading and writing skills loaded onto one factor, and 94% of the variance in responses was shared between the variables (Kaiser-Meyer-Olkin measure of sampling adequacy was .500. The Bartlett's Test of Sphericity was also significant, $\chi2$ (1) $= 171.987$, $p < 0.001$). Together, these results suggested that reported Spanish reading and writing skills were highly correlated and were strong measures of the same underlying construct, which we called bi-literacy. Thus, these variables were reduced to one bi-literacy variable, which was created by calculating the mean of students' self-reported proficiency in Spanish reading and writing. Three students did not report on Spanish reading skills; given the strong correlation between Spanish reading and writing skills, Spanish writing skills were used to determine their bi-literacy.

Motivation for Classroom Discussion. Students' motivation to participate in classroom discussion was assessed using a validated measure, the Motivation for Classroom Discussion Questionnaire (MCD-Q; Griskell et al., 2020b). This measure consists of 20 items related to five dimensions of student motivation: "language-efficacy," "value," "interest," "extrinsic motivation," and "social motivation". The measure items were placed into one of these dimensions based on the results of factor analyses, which group items with similar participant responses together (Griskell et al., 2020b). Students responded to items using a five-point Likert-type scale, rating each item from strongly disagree to strongly agree with a not sure option in the middle, which is interpreted as low motivation (-2) to high motivation (2), with a 0 at the mid-point. Each student's motivation score was created by calculating the mean rating of all items, then rounding the mean score to the nearest anchor-point. This measure has good internal reliability, $\alpha = 0.841$ (Field, 2009), and has overall reliability similar to measures of second language motivation, such as the Attitude/Motivation Index (AMI; $\alpha = .85$; Gardner & MacIntyre, 1993). The reliability of individual subscales ranged from $\alpha = 0.579\text{-}0.774$, which is consistent with the reliability of second language motivation questionnaires used with early adolescents (e.g., Dörnyei & Csizér, 2002; subscale reliability $= 0.41\text{-}0.81$). Moreover, as shown in Table 18, Pearson correlations demonstrated that the five components of motivation were positively and significantly correlated with one another (r's $= .194\text{-}.578$, p's < 0.05), with the exception of language-efficacy and extrinsic motivation ($p = 0.053$), and interest and social motivation ($p = 0.060$). See Appendix A for MCD-Q items and subscales with reliability.

Table 18. Correlations Between the Five Subscales of the MCD-Q.

Motivation Dimension	Language-Efficacy	Value	Extrinsic	Social	Interest
Language-Efficacy	—				
Value	.578*	—			
Extrinsic	.177	.381*	—		
Social	.328*	.476*	.487*	—	
Interest	.268*	.246*	.194*	.171	—

*Note. * p < 0.05*

Amount of Talk. Students' talk during their English Language Arts (ELA) class was gleaned from LENA Digital Language Processors (DLPs; LENA Research Foundation, 2015), which are light-weight audio recorders. The LENA DLPs come equipped with a language processing system that quantifies student talk as the number of vocalizations (i.e., speech segments that are preceded and followed by a pause of greater than 300 milliseconds) spoken by each student, in increments of five minutes. LENA DLPs have been used effectively in classroom settings to capture whole class discussions and student group work (e.g., Wang, Pan, Miller, & Cortina, 2014). As with other studies using naturalistic speech data, LENA-identified vocalizations were complemented by manual coding (see review Casillas & Cristia, 2019). Specifically, we coded for whether or not vocalizations occurred within discussion time frames. Discussion time frames were marked by teacher cues or questions that signaled the start of a class discussion (e.g., "Let's talk about…", "I want you to discuss with your group…", "Why do you think…"). Vocalizations were excluded from students' vocalization counts when they did not occur during discussion time frames or were unrelated to the topic of discussion or the class activity (e.g., singing; producing non-word sounds).

The total number of student vocalizations was divided by the total number of minutes that students had opportunities for classroom discussion (defined as an increment of five minutes

during which a student had at least one vocalization); this created a vocalization proportion for each student. Students were classified as generating either high (1) or low (0) amounts of talk during classroom discussion. Students generating a high amount of talk fell above the group's mean vocalization proportion, per minute ($M = 0.146$; range = 0 to .8), while students generating a low amount of talk fell below this group mean. Of note, inspection of the distribution of vocalization proportions indicated a non-normal distribution, demonstrating a natural break between a group of students with a high amount of talk and a group of students with a low amount of talk; this was also verified statistically (Shapiro-Wilk test of normality: $W(121) = 0.873$, $p < 0.001$).

Reliability for low and high amounts of talk was assessed by comparing the number of LENA vocalizations to a commonly-used measure of talk, students' number of utterances (i.e., phrases of speech bounded by a pause, breath, change in intonation, or conversational turn; MacWhinney, 2018). The number of utterances from 20-minute human-produced transcripts (i.e., written representations of language; MacWhinney, 2018) were obtained for half of the sample ($n = 64$), using the Mean Length Utterance (MLU) command in the Computer Language Analysis (CLAN) program of the Child Language Data Exchange System (CHILDES; MacWhinney, 2018). The mean number of utterances during a 20-minute transcript was 73.19 utterances ($SD = 51.803$). Despite the data being non-normally distributed, the mean was used as the cut-off instead of the median given the similarity of the mean (73.19) and median (72.00) values. Scores above this mean were designated as high amounts of talk ($n = 32$), while scores below this mean were designated as low amounts of talk ($n = 32$). An independent samples t-test revealed that students with high amounts of talk, as determined by utterances in human transcripts, had significantly more LENA vocalizations ($M = 9.03$, $SD = 10.823$) during the 20-

minute period of classroom discussion than did students with low amounts of talk ($M = 3.13$, $SD = 4.062$) in human transcripts ($t(62) = 2.890$, $p = .005$). This result was also verified using a non-parametric test due to the non-normality of the data distribution. The Mann-Whitney non-parametric test also suggested that students with high amounts of talk (determined by utterances in human transcripts) had significantly more LENA vocalizations (Mean rank = 39.98) during the 20-minute period of classroom discussion than did students with low amounts of talk (Mean rank = 25.02; $p = 0.001$). Thus, LENA is a reliable method of distinguishing students with high amounts of talk from students with low amounts of talk.

English Reading Comprehension. Students' English reading comprehension was assessed using the sixth-grade edition of the Group Reading Assessment and Diagnostic Evaluation (GRADE; Williams, 2001). The passage comprehension subtest of the GRADE is composed of six medium-length passages (fiction, non-fiction texts) that students read silently. Students then answer 30 multiple-choice questions related to the passages. The total number of questions correct out of 30 possible questions served as students' reading comprehension score. The publisher reports split-half reliability as α = .92 odd/even corrected = .96.

Procedure

Project approval was received both from the researchers' Institutional Review Boards (IRBs) and the schools where data collection took place. Informed consent was obtained from teachers and students' parent or guardian before data collection started. Students who provided their consent were also asked for their assent before participating in study tasks (e.g., audio-recordings, assessments, questionnaires).

Researchers attended one English Language Arts class session per participating classroom (12 classrooms total) in spring of the sixth-grade year to collect audio data from

students. All classrooms followed the same literacy curriculum, and the theme for the unit during

which students were audio-recorded was 'courage and freedom.' Audio-recordings of all

classrooms occurred within a period of two weeks. The LENA DLPs (audio recorders) were

worn individually by students, using pockets that were attached to lanyards. The DLPs were

turned on and distributed to students at the beginning of the ELA class, worn for the entire class

session, and turned off at the end of the class. Students then completed the bi-literacy

questionnaire and MCD-Q; each questionnaire took approximately 10 minutes (~20 minutes

total). Within two weeks of the recording and administration of these questionnaires, students

completed the English reading comprehension assessment in whole-group format; students took

up to 25 minutes to complete this assessment.

Analysis Methods

First, descriptive analyses were conducted in order to characterize the sample's reported

bi-literacy, motivation to participate in classroom discussion, reading comprehension scores, and

amount of talk. Then, preliminary regression and analysis of variance (ANOVA) analyses were

conducted in order to investigate relations between individual variables to be included in our

main analysis, including examining the relation between self-reported bi-literacy and motivation

to participate in classroom discussion (Research Question #1). To address our main research

question regarding how bilinguals' motivation and reported bi-literacy skills relate to their

amount of talk during classroom discussion (Research Question #2), we built a mixed-effects

logistic regression model to predict students' amount of talk. The main predictor variables were

self-reported bi-literacy, motivation to participate in classroom discussion, and the interaction

term of self-reported bi-literacy and motivation. We also accounted for students' English reading

comprehension scores, gender, and students' clustering by classroom.

Results

Descriptive analyses. As demonstrated in Table 19, descriptive results indicated that this

sample reported having strong English reading and writing skills. The sample was fairly evenly

split between being highly bi-literate and not being bi-literate. Results for amount of talk

revealed that there were approximately equal numbers of students who had high amounts of talk

during classroom discussion as those who had low amounts of talk during classroom discussion.

In terms of reading comprehension, the individual student scores varied from five to 30 questions

correct; the mean score was 18.512 correct ($SD = 6.369$) out of 30 questions.

Table 19. Descriptive analyses

Characteristic	N
Student rating of English reading & writing skills	
Read & write English well/very well	119
Read & write English average	2
Read & write English poor/very poorly	0
Student rating of Spanish reading & writing skills	
Read & write Spanish well/very well (Highly bi-literate)	50
Read & write Spanish average (Average bi-literacy)	22
Read & write English poor/very poorly (Not bi-literate)	49
Student amount of talk	
High amount of talk	59
Low amount of talk	62

As demonstrated in Figure 3, descriptive statistics also indicated that on a scale of low

motivation (-2) to high motivation (2) with a mid-point of 0, the mean composite motivation

score was 0.694 ($SD = 0.589$), which indicates that overall, students had positive motivation for

classroom discussion. Figure 3 also demonstrates the mean scores and standard deviations for

each of the dimensions of motivation, which were all above 0, indicating positive motivation in

the individual dimensions of motivation as well.

Figure 3. Means and Standard Deviations for Motivation to Participate in Classroom Discussion
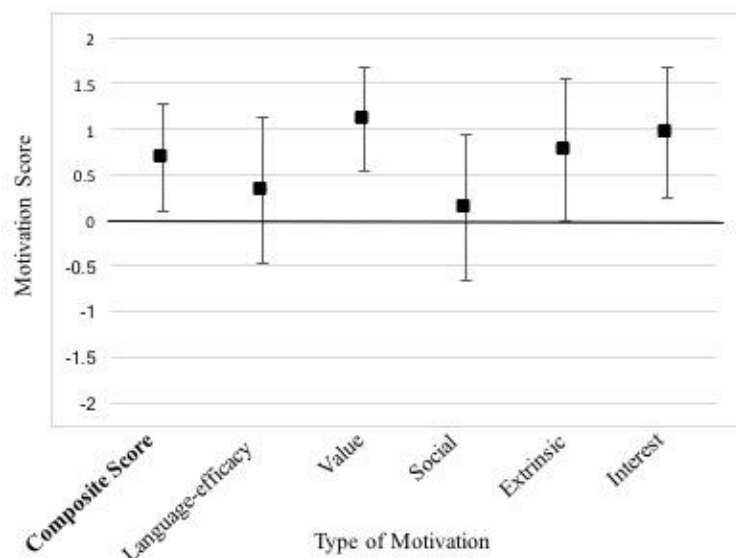
Relations between motivation, reported bi-literacy, reading comprehension, and talk

Precursor Analyses. Before investigating how bilinguals' motivation and bi-literacy skills relate to their amount of talk during classroom discussion, we examined the relation between self-reported bi-literacy and motivation to participate in classroom discussion (Research Question #1). Results of a regression analysis revealed a significant and positive relationship between self-reported bi-literacy and motivation, even when controlling for English reading comprehension and clustering by classroom ($B = 0.109$, $p = 0.007$). These results demonstrated that students who indicated being bi-literate reported having greater motivation to participate in classroom discussion than their peers who reported being less bi-literate.

We also conducted preliminary analyses examining students' amount of talk, using classroom as the clustering variable. Simple regression models revealed that students' amount of talk ($_{High\ Amount\ of\ Talk} = 1$ or $_{Low\ Amount\ of\ Talk} = 0$) was not significantly related to their reported bi-literacy skills ($_{reading\ and\ writing\ in\ Spanish\ "very\ well"} = 5$ to $_{reading\ and\ writing\ in\ Spanish\ "very\ poorly"} = 1$), $B = -0.148$; $p = 0.387$, or motivation scores ($_{High\ Motivation} = 2$ to $_{Low\ Motivation} = -2$), $B = -0.092$; $p = 0.820$.

A one-way ANOVA also revealed that bilinguals with high amounts of talk and bilinguals with low amounts of talk differed on English reading comprehension, such that bilinguals with high amounts of talk had higher English reading comprehension ($M = 19.915$, $SD = 6.032$) than their peers who had low amounts of talk ($M = 17.177$, $SD = 6.441$), $F(1, 119) = 5.810$, $p = 0.017$. Additionally, a simple regression model revealed that English reading comprehension was not related to students' motivation scores ($B = 0.239$; $p = 0.810$).

Predicting bilingual students' amount of talk during classroom discussion

Main Analyses. In order to examine how bilinguals' motivation and reported bi-literacy skills relate to their amount of talk during classroom discussion, we conducted mixed-effects logistic regression models using the lme4 function in R (Bates, Maechler, Bolker, & Walker, 2015; R Core Team, 2017). The models were built to predict the likelihood of a student having a high amount of talk or a low amount of talk during classroom discussion, *Amount of Talk* ($_{High\ Amount\ of\ Talk} = 1$; $_{Low\ Amount\ of\ Talk} = 0$). The final model included the main predictor variables *motivation* ($_{High\ Motivation} = 2$ to $_{Low\ Motivation} = -2$) and *reported bi-literacy* ($_{reading\ and\ writing\ in\ Spanish\ "very\ well"} = 5$ to $_{reading\ and\ writing\ in\ Spanish\ "very\ poorly"} = 1$), including these as an interaction term (Motivation * Bi-literacy). In addition, several control variables were added to the models. We added the *English reading comprehension* score to control for the finding that students who had a better understanding of text participated more in classroom discussions. In addition, we included *gender* ($_{female} = 2$; $_{male} = 1$) as a control variable given that slightly more females were included in this study than males and that previous research suggests that girls have greater motivation for discussion than boys (Wu et al., 2013). Moreover, there is empirical evidence to suggest that males may be more likely to participate in classroom discussion than females (Howe & Abedin, 2013; Julé, 2002).

As shown in Table 20 the final model demonstrated that the variable *reported bi-literacy* moderated the relation between motivation and amount of talk, such that students who report having a higher level of bi-literacy and higher motivation were more likely to have greater amounts of talk during classroom discussion ($p = 0.043$). *Gender* was significant in this model, indicating that males were more likely to have greater amounts of talk than females ($p = 0.032$). *Reading comprehension* was not significant in this model ($p = 0.088$). This final model containing the interaction was better fitting than the null model and the main-effects only model (see Table 21). It is worth noting that the exclusion of the interaction term *Motivation * Bi-literacy* in the main-effects only model revealed no significant main effects of motivation ($B = -0.198$; $p = 0.663$) or reported bi-literacy ($B = -0.061$; $p = 0.752$) in relation to amount of talk during classroom discussion, when clustering by classroom and controlling for gender and English reading comprehension.

Table 20. Mixed-effects Logistic Regression Model Predicting High- and Low-Amounts of Talk.

Parameter Estimates	B	SE	Z-value	p
Intercept	8.813*	4.193	2.102	0.036
Bi-literacy	-2.493*	1.221	-2.041	0.041
Motivation	-2.229*	1.110	-2.007	0.045
Reading Comprehension	0.069	0.040	1.708	0.088
Gender	-1.250*	0.525	-2.144	0.032
Bi-literacy*Motivation	0.664*	0.328	2.023	0.043

*Note. *$p < 0.05$

Table 21. Final Model Compared to Null Model and Main Effects Models

Model	Deviance	AIC	$\chi 2$	df	p
Final Model (with interaction)	128.22	142.22			
Comparison to Null Model	140.04	144.04	11.816	5	0.037
Comparison to Main-effects Only Model	132.43	144.43	4.209	1	0.040

*Note. *$p < 0.05$

To further probe the significant *Motivation * Bi-literacy* interaction, we used the

MODPROBE macro (Hayes & Matthes, 2009) for SPSS (IBM Corporation, 2016) that allowed

us to assess the impact of reported bi-literacy at specific conditional values of motivation. We

used the Johnson-Neyman Test to determine the regions of significance for the interaction.

Results revealed that interaction was significant at the both lower and higher ends of the

motivation scale, specifically at motivation values below -0.116 and motivation values above

1.824 (*p's* < 0.05). Thus, we investigated the change in simple slopes in both these regions of

significance. For the lower region of significance, as motivation increased from -1 to -0.25, the

slope relating reported bi-literacy to amount of talk increased from -1.096 to -0.620. For the

higher region of significance, as motivation increased from 1.85 to 2, the slope relating reported

bi-literacy to amount of talk also increased from 0.713 to 0.808. That is, the talk gap between

bilinguals who are more motivated and bilinguals who are less motivated is larger for higher

values of reported bi-literacy than it is for smaller values of reported bi-literacy. Thus, when bi-

literacy increases, the talk gap between bilinguals who are more motivated and less motivated is

expected to increase.

Discussion

Spanish-English bilinguals are a large and growing group of learners in U.S. public

schools (NCES, 2017). Although there is theoretical (MacSwan, 2017; Prevoo et al., 2015) and

empirical (Phillips Galloway et al., 2020; Proctor, Harring, & Silverman, 2017) support for language-related benefits of bilingualism during early-adolescence, U.S. Spanish-English bilinguals tend to be characterized in the empirical literature as underperforming on measures of English language and literacy, in comparison to their English monolingual peers (The Nation's Report Card, 2017). This discrepancy in English language and reading outcomes is likely the result of the challenges that Spanish-English bilinguals in the U.S. face, including being more likely to experience poverty and language barriers than students of English monolingual backgrounds (Alvarez, Michaels, Hurtado, Roldan, & Duran-Graybow, 2016; Child Trends, 2016). At the same time, research has suggested that supporting bilingual students' bi-literacy skills predicts improved English language outcomes for these students (Melby-Lervåg & Lervåg, 2011; Phillips Galloway et al., 2020; Prevoo et al., 2015). Thus, there has been a need for additional research investigating the factors, including bi-literacy skills, that may support positive English language development of Spanish-English bilingual students.

Other lines of research suggest that encouraging students to talk during classroom discussions may provide a platform from which they can build on their English language and reading-related skills (Murphy, Wilkinson, Soter, Hennessey, & Alexander, 2009; Nystrand, 2006; Ossa Parra et al., 2016; Zhang et al., 2013). However, there are differences in students' amount of talk during discussion even within the same classrooms (Murphy et al., 2016). Motivation is one important factor that research on literacy-related activities (Taboada Barber, et al., 2017; Wu et al., 2013) and the second language literature have identified as supporting students' language learning behaviors (Gardner, 2007; MacIntyre et al., 2002). Yet, the relation between bilinguals' motivation, specifically for classroom discussion, and their amount of talk during discussion has been largely unexplored in the existing literature. Thus, the main objective

of this study was to investigate the factors, including motivation to participate in classroom discussion and reported bi-literacy, that may predict Spanish-English bilingual students' amount of talk during classroom discussion.

Motivation for classroom discussion as a function of reported bi-literacy

The first research question asked how motivation to participate in classroom discussion differed for bilinguals as a function of their self-reported bi-literacy. Our results demonstrate that students who report being bi-literate are more motivated to participate in classroom discussion than their peers who report being less bi-literate, even when accounting for students' reading comprehension in the school language. These results suggest that stronger bi-literacy skills may have positive implications for bilingual students' English language skills. Our results are supported by other studies, which have demonstrated that bilingual adolescents give themselves higher self-ratings in English reading and writing skills than their English monolingual peers (Huang, Davis, & Ngamsomjan, 2017). Our results extend beyond this prior study (Huang, Davis, & Ngamsomjan, 2017) by examining benefits of bi-literacy within the heterogeneous group of Spanish-English bilinguals, that is, instead of comparing bilinguals to monolingual English speakers. Although comparisons to English monolinguals are sometimes warranted, a unique contribution of the present study is that it investigates the varied linguistic experiences of Spanish-English bilinguals in the U.S., in relation to their English language outcomes.

Our results of a positive relation between motivation and bi-literacy in the United States are similar to the findings of another study examining differences in motivation among students in Dutch-English bilingual education and mainstream education in the Netherlands (Mearns et al., 2017). Specifically, that study (Mearns et al., 2017) demonstrated that early adolescents who were in bilingual education (and thus likely had greater bilingual language skills) reported

having greater second language motivation than students who chose to be in mainstream education. We had similar study findings, despite differences between our study in the U.S. and the prior study conducted in the Netherlands (Mearns et al., 2017), including differences in policy climate and SES associated with bilingualism.

For example, the results of the present study have unique implications for bilinguals in the U.S. due to the difference in policy climate toward bilingualism in the U.S. in comparison to the Netherlands. Specifically, language education policy in the European Union (EU), including places like the Netherlands, has the goal of every citizen being multilingual, and bilingual education is designed to promote proficiency in two languages (Jeffery & van Beuningen, 2019). In contrast, U.S. language education policy favors English-only instruction (Jeffery & van Beuningen, 2019), which may limit U.S. bilinguals' access to the native language education that would encourage them to develop their bi-literacy. Thus, the results of the present study suggest that U.S. education policy should be revised to support bilinguals' native language skills. Through encouraging U.S. policy to support education in both the native and English languages, more students may experience benefits from well-developed bi-literacy skills, such as increased motivation to participate in discussion.

Our study of bilingual students in the U.S. also diverges from that prior study of bilingual students in the Netherlands (Mearns et al., 2017) due to the different socioeconomic statuses associated with bilingualism in the U.S. in comparison to the Netherlands. As noted, in the Netherlands, it has been suggested that bilingual education is associated with being from a high-SES background (Mearns et al., 2017; Sieben & van Ginderen, 2014). In contrast, in the U.S., students from Spanish-speaking homes are more likely to have a low-SES background than students from English monolingual households (Child Trends, 2016). Thus, the results of the

present study contribute to the literature by demonstrating that bi-literacy is related to motivation for bilinguals who are often from lower-SES backgrounds (i.e., Spanish-English bilinguals in the U.S.). That is, in the U.S. context, bi-literacy skills may have implications for motivation, particularly in the context of classroom discussion, that are not a function of high-SES. These findings suggest that bi-literacy may be a strength of Spanish-English bilinguals in the U.S., even in the face of challenges, such as higher rates of poverty among Spanish-English bilinguals than English monolinguals (Child Trends, 2016).

Reported bi-literacy and motivation as predictors of amount of talk

Our main research question investigated how bilinguals' motivation to participate in classroom discussion and reported bi-literacy predicted their amount of talk during classroom discussion. We were particularly interested in motivation to participate in classroom discussion, given the importance of strong English oral language skills for supporting reading comprehension during early adolescence (Lesaux et al., 2010). In addition, prior studies have demonstrated relations between amount of English language output produced by Spanish-English bilinguals during classroom discussion and their English language and literacy outcomes (Zhang et al., 2013; Zhang et al., 2016).

Our findings demonstrated that there was an interaction between reported bi-literacy and motivation in predicting amount of talk during classroom discussion. That is, bilinguals who reported higher levels of bi-literacy and motivation were more likely to engage in greater amounts of talk during classroom discussion, in comparison to their less bi-literate and less motivated peers. Our results are in line with studies of middle school students and adults suggesting that their second language motivation was positively correlated with their self-reported frequency of communication in that language (MacIntyre et al., 2002; MacIntyre &

Charos, 1996). The results of our study extend beyond these prior studies, which compared motivation to students' self-report of how likely they are to communicate in their second language (MacIntyre et al., 2002; MacIntyre & Charos, 1996), by demonstrating that motivation and bi-literacy are related to students' audio-recorded frequency of talk during classroom discussion.

Our finding that motivation and bi-literacy are positively related to students' amount of talk during discussion is also important to highlight in the context of prior motivation literature. Specifically, prior research suggests that there is a decline in students' literacy-related motivation throughout middle school, including for students from Spanish-speaking communities (Unrau & Schlackman, 2006). Yet, the literature has primarily focused on promoting reading motivation (Guthrie, Wigfield, & You, 2012 for review), and there is little research on the implications that motivation for classroom discussion may have for bilinguals' language outcomes. Thus, our results extend this prior research by suggesting that it is important to also support students' motivation to participate in classroom discussion to support their school language development.

Limitations and future directions

When interpreting the present study findings, some study limitations deserve mention. For example, the present study measured bilinguals' amount of talk during classroom discussion. However, given the linguistic strengths of bi-literate students, it is possible that the linguistic contributions of bi-literate and non-bi-literate students during classroom discussion differ not only quantitatively, but also qualitatively. For instance, it is possible that talk of bi-literate students may contain more evidence of higher-level thinking (e.g., inferences, inter-textual connections) than their non bi-literate peers due to bi-literacy facilitating the development of their cognitive skills or encouraging them to think from more than one perspective. Given that

the LENA system is limited to providing vocalization counts, we did not analyze the qualitative contributions of students' talk. Thus, future studies should investigate how the type or quality of bilinguals' talk may differ as a function of bi-literacy.

Another potential limitation of this study is that bi-literacy was determined using a self-report measure. Due to constraints of class time to be for a larger study (Gámez & Lesaux, in prep), we were unable to administer Spanish assessments to the sample in the present study, who were drawn from this larger study. Thus, future studies should examine whether the results of the present study may be replicated with other measures of bi-literacy, such as standardized reading and writing assessments.

Finally, our study focused on a subgroup of early-adolescent bilingual learners in the U.S., specifically, Spanish-English bilinguals given that this is a fast-growing group in U.S. public schools (NCES, 2016). Future research is needed to determine whether similar findings would be revealed with bilinguals with different language backgrounds. It is possible that strong native literacy skills in Spanish may translate more easily to English literacy skills given the similarities between these two languages (e.g., orthography). In contrast, languages with greater orthographic differences (e.g., Mandarin Chinese, etc.) may not produce the same transfer effect to English.

Despite these limitations, our study suggests that, in the U.S. context, bi-literacy skills may be a strength that promote Spanish-English bilinguals' motivation for classroom discussion. Additionally, motivation to participate in classroom discussion and reported bi-literacy positively contribute to bilingual students' amount of talk during classroom discussion. Thus, through supporting students' bi-literacy and providing motivating classroom discussion environments, students may be more likely to participate in classroom discussion.

CHAPTER FIVE

GENERAL DISCUSSION

A large percentage of U.S. public school students are Latino, Spanish-English Dual

Language Learners (DLLs; Krogstad, Stepler, & Lopez, 2015; NCES, 2021a). DLLs bring

unique language-related strengths to the classroom given their knowledge of both the English

and Spanish languages (García & Ozturk, 2017). These language-related strengths may support

DLLs' English literacy skills during early adolescence (e.g., Aguilar et al., 2020), a

developmental period when many students have challenges with reading comprehension (NCES,

2019). However, most studies of DLLs' literacy are focused on early childhood (see Gámez,

2020 for review), which leaves open questions about the multiple factors that promote early-

adolescent DLLs' literacy skills. Thus, the present dissertation, comprised of three studies,

examined how environmental (i.e., the classroom language environment), language-related (i.e.,

individual oral language skills), and motivational factors (i.e., motivation for classroom

discussion) related to early-adolescent DLLs' reading comprehension.

Summary of findings for Study 1, Study 2, and Study 3

   The middle school classroom environment & DLLs' reading comprehension. The

purpose of Study 1, "Classroom Discussion and Early-Adolescent Dual Language Learners'

Motivation and Reading Comprehension", was to examine how students' engagement in the

classroom language environment, via classroom discussion, was related to their reading

comprehension. Specifically, we asked, given an authentic discussion environment,

"*how do DLLs' motivation for and engagement in high-quality discussion practices relate to their reading comprehension?*" To answer this research question, we first determined whether students' classroom environments allowed them to engage in authentic classroom discussions or not. Teachers' questioning practices are a feature of the classroom language environment that determine students' opportunity to engage in authentic discussions. Thus, in Study 1, we also examined teachers' questioning practices as a potentially important contributor to DLLs' reading comprehension. In particular, we asked, "*what is the relation between middle school teachers' questioning practices and their DLL students' reading comprehension?*" and "*how can we characterize teachers' use of questioning practices across the school year?*"

Our results demonstrated that, when given the opportunity to engage in an authentic discussion environment, there was a significant and positive relation between DLLs' high-quality discussion practices and their end-of-the-year reading comprehension as a function of their language-efficacy (i.e., beliefs about their capabilities to use language). That is, the higher DLLs' language efficacy was, the more positive effect there was of their high-quality discussion practices on their reading comprehension. Our findings also suggest that teachers facilitated this high-quality, authentic discussion with the types of questions they posed. That is, our results demonstrated that teachers' authentic (open-ended) questions were positively related to their DLL students' end-of-the-year reading comprehension, but their test (closed-ended) questions were not. These findings identify teachers' authentic questions (and thus opportunities for authentic discussion) as components of the high-quality language environment, which support older DLLs' English reading comprehension skills. In contrast, when teachers restrict opportunities for discussion through use of test questions, their students' reading comprehension skills do not improve. Our results also demonstrated that teachers' questioning practices were

stable across the school year, which means that teachers persisted in their patterns of question use over time. This finding, of stability in questioning practices, suggests that professional development interventions may be needed to increase the authentic question use of teachers who typically use few authentic questions.

As a whole, Study 1 makes a critical contribution to the literature given that it is one of a few studies that have examined the role that the middle school classroom language environment plays in early-adolescent DLLs' English language and reading comprehension skills (Gámez & Lesaux, 2012; 2015). Specifically, the finding that authentic discussion is related to DLLs' reading comprehension, is particularly important given that the middle school classroom environment is often characterized as teacher-controlled (Cazden, 2001; Eccles et al., 1993; Eccles & Roeser, 2011). Our results emphasize the need to re-design the middle school classroom to be a student-centered and linguistically-interactive environment that better supports early adolescent DLLs' reading comprehension skills.

Early adolescent DLLs' language skills & reading comprehension. The purpose of Study 2, "Bilingual Language Skills and Early-Adolescents' Reading Comprehension", was to examine how DLLs' oral language skills were related to their reading comprehension. We specifically asked, "*how are early-adolescent DLLs' English oral language skills (i.e., vocabulary, syntax) related to their English reading comprehension?*" and "*how are early-adolescent DLLs' Spanish oral language skills (i.e., vocabulary, syntax) related to their English reading comprehension?*" Study 2 findings demonstrated that DLLs' English syntactic skills were positively related to their English reading comprehension, and DLLs' English vocabulary skills were marginally and positively related to one aspect of their English reading

comprehension: sentence comprehension. Spanish vocabulary and Spanish syntax were not statistically significant predictors of English reading comprehension.

Study 2 contributes to the growing body of literature that examines DLLs' oral language skills, beyond the domain of vocabulary. Specifically, the results of Study 2, demonstrating a positive relation between English syntax and English reading comprehension, suggest that advanced knowledge of sentence structures is important for older DLLs' reading comprehension (Aguilar et al., 2020; Phillips Galloway et al., 2020; Scott & Balthazar, 2010). This finding, that English syntax is related to English reading comprehension, is consistent with studies demonstrating a positive relation between syntax and reading comprehension for elementary school students (Geva & Farnia, 2012; Proctor et al., 2017; see Proctor & Zhang-Wu, 2019 for review; Swanson, Rosston, Gerber, & Solari, 2008). However, our study findings extend this body of literature by showing that syntax continues to predict reading comprehension for DLLs into middle school (i.e., beyond elementary school). This particular finding implies that targeted syntax instruction may promote DLLs' reading comprehension skills, even during middle school.

DLLs' motivation & engagement in classroom discussion. The purpose of Study 3, "Bi-literacy and Motivation as Predictors of Bilingual Students' Talk During Classroom Discussion", was to examine DLLs' motivation for classroom discussion, a reading-related activity that promotes students' English language and reading skills. In particular, Study 3 research questions included, "*how does motivation to participate in classroom discussion differ for bilinguals as a function of bi-literacy (i.e., reading and writing skills in Spanish and English)?*" and "*how do motivation and bi-literacy relate to bilingual students' amount of talk during classroom discussion?*" The study findings demonstrated that bilinguals who reported having stronger bi-literacy skills had higher motivation to participate in classroom discussion

than bilinguals who had weaker bi-literacy skills. Results also revealed an interaction effect, such that bilinguals with higher motivation and stronger bi-literacy skills were more likely to have greater amounts of talk during classroom discussion than did bilinguals with lower motivation and weaker bi-literacy skills.

Study 3 findings contribute to the emerging literature on DLLs' motivation for reading-related activities (Griskell, Gámez, & Lesaux, 2020a; 2020b; Proctor et al., 2014; Taboada Barber et al., 2015; Taboada Barber et al., 2020). In line with the previous motivation literature (see Wigfield & Gladstone, 2019 for review), Study 3 demonstrated the importance of motivation for classroom discussion in supporting early-adolescent DLLs' language-related outcomes. Specifically, DLLs' motivation for classroom discussion, together with bi-literacy skills, was related to their amount of talk during classroom discussion. This finding suggests that motivation is related to early-adolescent DLLs' engagement in the literacy-related activities that facilitate their reading comprehension, like classroom discussion. Further, Study 3 extends the prior literacy motivation literature, which has focused almost exclusively on reading motivation (see Guthrie, Wigfield, & You, 2012; Taboada Barber & Lutz Klauda 2020; Wigfield, Gladstone, & Turci, 2016), to suggest that motivation for classroom discussion deserves greater research attention, as engaging in classroom discussion can develop older learners' English language and reading skills.

DLLs' reading comprehension and the Componential Model of Reading

Together, the findings from this three-study dissertation highlight the importance of taking a comprehensive view of early-adolescent DLLs' reading comprehension. Specifically, the Componential Model of Reading (CMR; Aaron, Joshi, Gooden, & Bentum, 2008; Joshi, 2019) emphasizes the contributions of a multitude of factors to reading comprehension,

including ecological, cognitive, and psychological factors. Specifically, within the ecological domain of the CMR (Aaron et al., 2008; Joshi, 2019), the classroom is considered an essential environment for DLLs' English language and literacy learning (see Gámez, 2020 for review). In particular, the classroom is where DLLs receive formal instruction in English (Gillanders, Castro, & Franco, 2014) and opportunities to practice using English, for example, during classroom discussions (Zhang, Anderson, & Nguyen-Jahiel, 2013). Yet, despite the importance of ecological domain for students' reading comprehension, this dissertation represents one of only a few studies examining early-adolescent DLLs' classroom environments (Gámez & Lesaux, 2012; 2015). The findings from Study 1, demonstrating a relation between authentic discussion environments and reading comprehension, show support for the ecological domain of the CMR. That is, classroom language environments characterized by high-quality, authentic discussions facilitate early-adolescent DLLs' reading comprehension. These findings emphasize the need for further research on the components of the middle school language environment that promote DLLs' reading comprehension.

Within the cognitive domain of the CMR (Aaron et al., 2008; Joshi, 2019), two language skills, word recognition and linguistic comprehension, support students' reading comprehension. Research suggests linguistic comprehension skills (i.e., oral language skills) are particularly important for supporting the reading comprehension of early adolescents (Lervag, Hulme, & Melby-Lervag, 2018; Ricketts et al., 2020). That is, older students can often recognize individual words, but may have difficulties using oral language skills to comprehend the sentences and paragraphs that these words compose. Indeed, our Study 2 findings demonstrate the importance of oral language skills, in particular, English syntax, for English reading comprehension. Thus, our results lend further evidence to the importance of the cognitive domain of the CMR, which

suggests that linguistic comprehension plays a key role in early adolescents' reading comprehension skill.

Finally, within the psychological domain of the CMR (Aaron et al., 2008; Joshi, 2019), affective variables, such as motivation and engagement, promote students' reading comprehension skills. Motivation is often described as energizer and director of behavior based on an individuals' beliefs, values, and goals (Eccles & Wigfield, 2002; Guthrie, Wigfield, & You, 2012; Wigfield & Eccles, 2020). The Engagement Perspective on Reading (Guthrie & Wigfield, 2000; Guthrie, Wigfield, & You, 2012) suggests that students' motivation is important for their reading outcomes because motivation is a requisite for engagement in literacy-related activities. Our Study 3 findings, demonstrating an interaction between motivation and bi-literacy in predicting DLLs' participation in classroom discussion, support this perspective (Guthrie & Wigfield, 2000; Guthrie, Wigfield, & You, 2012). That is, our study findings are consistent with the psychological domain of the CMR and the reading literature, which demonstrate positive relations between students' motivation, their engagement in literacy activities, and their reading outcomes (Froiland & Oros, 2013; Guthrie, Klauda, & Ho, 2013; Klauda & Guthrie, 2015; McGeown, Duncan, Griffiths, & Stothard, 2015; see Wigfield, Gladstone, & Turci, 2016 for review). Thus, our results suggest that supporting early-adolescent DLLs' motivation for classroom discussion will promote their reading comprehension skills.

In sum, the findings from this dissertation demonstrate that it important to consider both individual student-level factors and environmental factors in supporting early-adolescent DLLs' English literacy skills. Specifically, the results from these three studies demonstrate that motivation, strong English and Spanish skills, and environments that provide opportunities to use high-quality language facilitate the development of older DLLs' English reading comprehension

skills. Through increased attention to these developmentally relevant factors, we may promote

the positive English language and literacy development of early-adolescent DLLs.

APPENDIX A

MCD-Q SUBSCALES

MCD-Q Subscales (N = 20 Items, Cronbach's Alpha = 0. 839)

Language-Efficacy (n = 5; Cronbach's Alpha = 0.774)
I am comfortable sharing my ideas out loud in class.
I feel that my speaking abilities are strong.
I enjoy discussing challenging ideas in class.
I enjoy participating in class discussions.
I like to use challenging words and sentences during classroom discussions.

Value (n = 5; Cronbach's Alpha = 0.625)
I think that participating in class discussions is important.
Participating in classroom discussions helps me get better grades.
Taking part in class discussions will improve my speaking abilities.
I like learning about different opinions and points of view from class discussion.
Classroom discussions help me understand what I am reading in class.

Interest (n = 3; Cronbach's Alpha = 0.579)
I participate more in class discussions when I am interested in a topic.
I join classroom discussions when we are talking about something I like.
When we discuss a book I enjoy, I am more likely to participate in discussion.

Extrinsic Motivation (n = 3; Cronbach's Alpha = 0.711)
I like when my teacher praises me for what I have to say in class.
I like when my classmates compliment me on what I have to say in class.
I enjoy being told that I had a good idea in class.

Social Motivation (n = 4; Cronbach's Alpha = 0.718)
I take part in class discussions to feel included.
I join class discussions to feel connected to my classmates.
I feel like I am part of the classroom community when I participate in class

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