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# The Reciprocal Effects of Language Proficiency and Depression among Low Income Latino Youth

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The Reciprocal Effects of Language Proficiency  
and Depression among Low Income Latino Youth

A Thesis

Presented in

Partial Fulfillment of the  
Requirements for the Degree of  
Master of Arts

By

Nicole Alexandra Colón Quintana

March, 2017

The Department of Psychology

College of Science and Health

DePaul University

Chicago, Illinois

**Thesis Committee**

Antonio J. Polo, Ph.D., Chairperson

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## **Acknowledgments**

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## **Biography**

Nicole Alexandra Colón Quintana was born in Aibonito, Puerto Rico and graduated from Radians High School in Cayey, Puerto Rico. She received her Bachelor of Science degree from The Pennsylvania State University in 2013.

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## Abstract

Extant research suggests that language plays an important role in both social processes and emotional encoding and regulation. In dual language youth, the maternal tongue has been observed as a protective factor against maladaptive outcomes (Toppelberg & Collins, 2010). Although Latino youth are at a heightened risk for depression (CDC, 2013), and a majority grow in Spanish-English speaking households (Pumariiega et al., 2013), the impact of dual language development in their psychosocial well-being remains poorly understood. It is known that limited English language proficiency during early school years is predictive of maladaptive outcomes such as externalizing problems (Dawson & Williams, 2008). Previous studies have reported associations between Spanish and English self-reports of language proficiency and youth adjustment (Polo & Lopez, 2009). However, research has not examined objective measures of language proficiency and their relation with depression among Latino youth. Further, although some researchers have proposed that language difficulties precede depressive symptoms, the inverse has not been explored. Given the cognitive deficits often associated with depression, it is imperative to disentangle the directionality of this relation and explore the factors of depression that may hinder critical language processes. This study, which included two time points, addressed these gaps by investigating the relation between language proficiency and depression in a community sample of dual language Latino adolescents. Participants included 397 Latino students ages 10-15 years ( $M = 12.0$ ; 51.9% female), the majority of whom (82.4%) were from

families reporting household incomes below \$40,000. Results indicate that, at baseline, a majority of the students (58.9%) exhibited higher levels of English proficiency compared to Spanish, and approximately one in five (21.7%) showed limited proficiency in both languages. Also at baseline, youth with limited language proficiency were found to be at a higher risk for depression, and higher Spanish language proficiency was associated with lower depressive symptoms. Cross-lagged panel analyses using longitudinal data indicated that the model for English proficiency (Model 2) fit the data well,  $\chi^2(99) = 211.19, p < .001$ , CFI = .93, TLI = .92, RMSEA = .07 (90% CI [.06, .09]). In a one-year period, increases in English language proficiency are predictive of decreases in depressive symptoms. Likewise, increases in depressive symptoms are predictive of decreases in English language proficiency. Results suggest both Spanish and English languages play a significant role in the well-being of Latino youth, specifically, their depressive symptoms. More needs to be known about the specific pathways connecting language proficiency and depression to allow for the design of appropriate psychological interventions and sensible educational policies for students of diverse linguistic backgrounds. Limitations and implications for future research are discussed.

*Keywords:* dual language proficiency, depression, Latino, adolescents, cross-lagged panel

## **Introduction**

In the United States, about 10 million (more than 20.0%) of all students enrolled in public schools grow up exposed to more than one language at home (Pew Hispanic Center, 2008). Recent reports show that a vast majority (6.9 million) of those 10 million dual language students live in Latino households where Spanish is one of the predominant languages (Pew Hispanic Center, 2008). Although there has been a nation-wide increase in English proficiency (Pew Research Center, 2015), over one quarter (26.0%) of dual language students still report that they speak English less than “very well.” These trends coincide with reports showing that, as they enter adolescence, Latinos are also at a greater risk for depression than youth from other ethnic and racial groups (CDC, 2013). Recent research has suggested that reduced Spanish and English oral language proficiency (also referred to as oral language skills in this study) are associated with higher levels of depression in Latino adolescents (Polo & Lopez, 2009). Yet, the long-term impact of dual language competence in the psychological adjustment of Latino youth remains poorly understood and in need of increased research efforts (Collins, Toppelberg, Suárez-Orozco, O’Connor, & Nieto-Castañón, 2011). Given that Latino youth are projected to comprise more than one quarter of the US population by 2060 (US Census, 2015), it is imperative to elucidate the paths connecting dual language proficiency and depression in this population.

### **Depressive Symptoms and Disorders among Latino Youth**

Mood disorders, including depression, are among the most pervasive mental

health problems in adolescence (Merikangas et al., 2010). Recent epidemiological data reveal that Latino youth are 1.4 times more likely to be diagnosed with a depressive disorder than youth from other racial and ethnic backgrounds (Merikangas et al., 2010). A secondary analysis of the 2003 California Health Interview Survey also revealed that depressive symptoms risk rates were twice as high for Latino youth compared to Non-Latino European American youth (Mikolajczyk, Bredehorst, Khelaifat, Maier, & Maxwell, 2007). Risk rates were calculated based on responses to the Center for Epidemiologic Studies Depression Scale (CES-D). A meta-analytic study reported that Latino children and adolescents have also been found to endorse more depressive symptoms on the Children's Depression Inventory (CDI) than peers from other ethnic groups (Twenge & Nolen-Hoeksema, 2002). Additionally, Latino youth appear to report higher levels of somatization compared to Asian American, African American, and European American youth (Anderson & Mayes, 2010; Canino, 2004). In a large multiethnic study of middle school students (grades 6-8), Latina adolescents reported the highest levels of depressive symptoms compared to peers from African American and European American backgrounds (McLaughlin, Hilt, & Nolen-Hoeksema, 2007). This finding is consistent with national statistics which have shown that, over the past three decades, Latina adolescents consistently exhibit higher levels of depressive symptoms, suicidal ideation, and suicidal attempts (Wagstaff & Polo, 2012; CDC, 2013) than their male counterparts from Latino and other racial and ethnic groups. Despite evidence for ethnic differences in symptom endorsement and presentation, the reasons for these disparities

remain poorly understood. Further, high rates of depression among young Latinos highlight the need for increased prevention-focused research (Merikangas et al., 2010). Identifying risk factors that place Latino youth at a higher risk for depressive symptoms would facilitate our understanding of the onset and development of symptoms in this population. Given the pivotal role that language plays in culture, examining language development offers an opportunity to understand both risk and protective factors that are linked to the onset of depression in this population.

### **Dual Language Development**

Understanding the language development of US Latino youth requires a close evaluation of dual language profiles. The field of linguistics suggests that dual language acquisition occurs in two ways: simultaneous or sequential. In simultaneous acquisition, both languages are acquired at the same time, before the age of three years. In turn, sequential acquisition occurs when a second language is acquired after the age of three years. The development of each language is generally dependent upon support, need, and exposure (Grosjean, 2013; Hammer et al., 2012). These three factors are key in determining whether bilingualism will become either additive or subtractive. In additive bilingualism, acquisition of both languages is supported, resulting in proficiency in both. In turn, in subtractive bilingualism, the acquisition of a second language results in the loss of the first language. Throughout an individual's lifetime, changes in need, support, and exposure may result in shifts in language dominance and proficiency. Given the complexities of dual language development, it is important to study each language

in terms of both proficiency and dominance (Collins et al., 2014). That is, identifying one language as being dominant over the other does not mean that the individual is proficient at the dominant language. It is important to make a distinction between dominance and proficiency because a child or adolescent may be dominant in one language without exhibiting age- or grade-appropriate levels of proficiency in that language. Collins and colleagues (2014) thus propose a taxonomy of dual language profiles whereby children and youth are characterized either by (a) age/grade-appropriate proficiency in both languages (dual proficient), (b) age/grade-appropriate proficiency in only one of their languages (English proficient or Spanish proficient), or (c) limited proficiency in both languages (limited proficient). Dual language proficiency is attainable with the appropriate resources, opportunity, and motive regardless of age of acquisition (Kohnert, 2008).

**Language Development among Latino youth.** Recent reports suggest that a majority of US Latino children are sequential bilinguals who learn Spanish first (Toppelberg & Collins, 2010), and later experience subtractive bilingualism. To date, an estimated 40.0% of US-born Latinos do not speak Spanish at home, compared to 95.0% of foreign-born Latinos (Pew Research Center, 2015). Although Spanish use is still prevalent in immigrant households (Pew Research Center, 2015), a vast majority of Latino youth are educated in US public schools. Thus, Latino students are instructed in environments with reduced bilingual education, where English dominance and proficiency are regarded as the ideal. This push for English-only approaches has resulted in strict educational policies

in states such as Arizona, California, and Massachusetts, where English language learners are expected to acquire grade-appropriate English skills within one year of school entry (de Jong, 2011).

Although it has been reported that subtractive bilingualism is now happening at earlier stages of schooling, particularly for children born in the US to immigrant parents (Toppelberg & Collins, 2010), more research is needed to understand developmental trajectories. Emerging literature suggests children in the early stages of education exhibit trajectories leading to dual proficiency in English and Spanish. For example, a recent longitudinal study used formal assessments to evaluate the dual language profiles of second-generation Latino children. Children were evaluated at kindergarten and second grade. Findings revealed that a majority of children with dual language profiles (63.0%) reached proficiency in one or both languages in the two-year period. By second grade, 21.0% of children became dual proficient, 30.0% became English proficient, and 12.0% became Spanish proficient (Collins et al., 2014). Significance tests revealed that children who were Spanish proficient at kindergarten were more likely to become dual proficient than to remain Spanish proficient or become English proficient by second grade. Given the scarcity of knowledge about dual language profiles in adolescence it is still unknown how stable these profiles remain across time. It is conceivable that profiles may continue to change as Latino children grow and develop their language skills, particularly because proficiency levels are still emergent at the time children enter school. It is also conceivable that an increased push for English dominance and proficiency in

academic environments affects language profiles throughout childhood and adolescence. More research is needed to improve our knowledge of dual language development in Latino children and youth. This study aims to address this issue by evaluating the dual language profiles of Latino youth in early adolescence as well as to examine changes across time.

### **Dual Language Development and Mental Health**

Extant research has established a strong link between language competence and psychosocial well-being in children and adolescents (Collins et al., 2011; Bornstein, Hahn, & Suwalsky, 2013). It has been suggested that language plays a critical role in both social processes and emotional encoding and regulation (Toppelberg & Collins, 2010). Most of the existing research, however, focuses on monolingual populations with specific language impairments (SLI). SLI is a diagnostic category assigned to children who fail to develop age-appropriate language skills. Around the world, SLI and delays have been often associated with adaptation difficulties and various forms of anxiety and depression in monolingual children and adolescents (McCabe & Meller, 2004; Conti-Ramsden & Botting, 2008; Wadman, Botting, Durkin & Conti-Ramsden, 2011; Norbury, 2013). Longitudinal studies suggest these outcomes extend into adulthood, affecting both educational attainment and occupational status (e.g., Johnson, Beitchman, & Brownlie, 2010). Although similar findings have extended to bilingual populations with SLI (Toppelberg, Medrano, Morgens, & Nieto-Castañon, 2002), it should not be assumed that associations between language and psychosocial well-being are exclusively found in populations with

SLI or delays. Studies have only recently begun to include general samples of bilingual children (e.g., Collins et al., 2011).

Delving into the specifics of language development and SLI diagnoses is beyond the scope of this review; nonetheless, it is important to note the distinction between reduced language competence and SLI. Low language competence in either language may not be associated with delays or disorders; both general benchmarks for research with monolingual populations. Unlike their monolingual counterparts, bilingual children experience different language trajectories. Their levels of competence depend on the need for, and context, in which each language is learned and used (Grosjean, 2013), suggesting low proficiency levels in either language may or may not indicate a delay or SLI. Toppelberg and Collins (2010) suggest that language disorders should only be suspected in bilingual children when (a) there are significant impairments in both languages even after significant exposure to both, and (b) there are language-based learning difficulties. Although it is important to highlight these distinctions, it is not a present aim to delineate diagnostic boundaries or categorize participants according to their language competence. Instead, this study aims to develop a better understanding of how language trajectories in dual language youth affect and are affected by their emotional well-being, and focusing on a general population, rather than only among those with emotional or language impairments or disorders.

**Mental health among dual language Latino youth.** Associations between language proficiency and internalizing symptoms have been observed in youth from immigrant backgrounds across cultures (Han, 2010; Han & Huang,

2010; Nguyen, Rawana, & Flora, 2011). Recent research shows that mental health outcomes in dual language youth appear to vary according to their levels of language proficiency, with better outcomes among those who exhibit dual proficiency (Portes and Hao, 2002). Portes and Hao (2002) suggest that dual language proficiency goes beyond the ability to communicate across contexts because it represents the possibility of solidifying the individual's identity through cultural connectedness with parents, family, and community. Across fields of research, dual proficiency has been associated with enhanced cognitive functions (Kroll, Dussias, Bogulski, & Valdes Kroff, 2012; Castro, García, & Markos, 2013), high academic achievement (Lee & Hatteberg, 2015; Lutz, 2007), and psycho-social well-being (e.g., Collins et al., 2011) in community samples of children and adults. In a national sample of Latino children from the Early Childhood Longitudinal Study (ECLS) followed from kindergarten to fifth grade, bilingual children exhibited lower internalizing problems, and a slower rate of increase for internalizing behavior than their European American monolingual peers (Han, 2010). Similar findings were reported among Asian American children participating in the ECLS, suggesting that dual proficiency in kindergarten is protective against internalizing and externalizing problems in middle childhood (Han & Huang, 2010).

Mixed results regarding the role of English proficiency alone also appear to support the benefits of dual proficiency. For example, a longitudinal study with a community sample of Latino children found that limited English language proficiency in first grade predicted externalizing behaviors in third grade (Dawson

& Williams, 2008). In contrast, findings from a large, nationally representative sample showed that Latino English-proficient fifth graders exhibited the highest rates of externalizing behaviors compared to their European American monolingual and Latino dual proficient peers (Han, 2010). Both findings suggest that English proficiency is not necessarily protective, instead equal proficiency for English and Spanish language at an age- or grade-appropriate level appears to result in more adaptive outcomes among Latino children.

Among adolescents of Mexican American descent, lower Spanish and English language proficiency have been linked to higher levels of depression (Polo & Lopez, 2009). In a psychiatric sample of Latino youth ages five to 16, diminished proficiency in either language was associated with higher externalizing symptoms (Toppelberg et al., 2006b). In this study, contrary to the researchers' hypothesis, each language (i.e., English and Spanish) was an independent predictor of outcomes. This finding suggests that in bilingual children and youth both languages are unique contributors to symptom severity. It is possible that language contextualization (e.g., Spanish at home, English at school), or the assumption that for Latinos each language is tied to specific protective processes in different contexts, explains some of the non-shared variance found in this study. For instance, language hassles in English and Spanish (stressful experiences associated with reduced language proficiency) in the fifth grade have been found to predict internalizing symptoms in the seventh grade among Mexican American youth (Nair, Roosa, & Zeiders, 2013).

Although both externalizing and internalizing symptoms have been linked

to language proficiency among Latino children, more research focusing on internalizing symptoms during early adolescence is warranted for several reasons. First, as mentioned earlier, Latino youth are at an increased risk for depression compared to peers from other racial and ethnic groups (Merikangas et al., 2010). Second, literature examining language and internalizing symptoms among Latino youth remains scarce. Finally, developmental changes may signal evolution in symptom expression. British children with SLI, for instance, have exhibited reductions in externalizing problems, stable patterns of emotional problems, and increases in social problems in the period from childhood to adolescence (St Clair, Pickles, Durkin, & Conti-Ramsden, 2011).

*Limitations of the existing literature.* Although there is consistent evidence to suggest a link between diminished language abilities and internalizing symptoms in Latino children, there is a dearth of knowledge regarding the longitudinal trajectories of dual language Latino adolescents in the US. As shown in Table 1, two longitudinal and seven cross-sectional studies have found significant associations between diminished language abilities and maladaptive outcomes in Latino dual language children, particularly, externalizing behaviors. Out of those nine studies, six have included youth above the age of 11 years. Our ability to draw conclusions from those six studies, however, is limited by several methodological issues. For instance, three of the six studies only evaluated children with SLI and include a wide range of ages (i.e., Toppelberg et al., 2006a; Toppelberg et al., 2006b; Toppelberg et al., 2002); limiting our ability to interpret results across age groups and to generalize findings to youth without SLIs.

Another major limitation is that studies evaluating youth aged 11 to 15 have employed cross-sectional designs and have either used self-report measures of language proficiency or have evaluated language as an acculturative stressor (i.e., Gonzales et al., 2006; Martinez, Polo, & Carter, 2012; Polo & Lopez, 2009). These limitations hinder our understanding of how language difficulties relate to internalizing problems outside of clinical settings, and point to the need for more research with community samples. Given the complexities involved in the study of dual language development, it is best to employ formal assessments upon evaluating dual language profiles over time. To the author's knowledge, no study has examined the relation between Spanish and English language proficiency and depression among early adolescent Latinos using a longitudinal design with a school-based sample. This study will include all such features and also address previous methodological limitations by obtaining standardized assessments of both Spanish and English language proficiency across time points.

Table 1.  
*Summary of Studies of Language and Mental Health in Latino Youth*

Study	Design	Age	Sampling Context	Languages & Method of Assessment	Outcome Examined
Collins et al., 2011	Cross-sectional	5-7	Community	English (St) & Spanish (St)	Emotional, behavioral, & academic
Dawson & Williams, 2008	Longitudinal †	5-8	Community	English (St)	Internalizing & externalizing
Han, 2010	Longitudinal †	5-11	Community	English (St) & Spanish (Rp)	Internalizing & externalizing
Martinez et al., 2012	Cross-sectional	11-14	Community	English (Rp) & Spanish (Rp)	Anxiety
Gonzales et al., 2006	Cross-sectional	11-15	Community	English (Rp) & Spanish (Rp) as acculturation proxy	Conduct problems & depression
Polo & Lopez, 2009	Cross-sectional	11-15	Community	English (Rp) & Spanish (Rp)	Depression, anxiety, & loneliness

Toppelberg et al., 2006a	Cross-sectional	5-16	Clinical (SLI)	English (St) & Spanish (St)	Profiles & prevalence of psychopathology
Toppelberg et al., 2006b	Cross-sectional	5-16	Clinical (SLI)	English (St) & Spanish (St)	Internalizing & externalizing
Toppelberg et al., 2002	Cross-sectional	5-16	Clinical (SLI)	English (St) & Spanish (St)	Internalizing & externalizing

*Note.* (St) = Standardized assessment, (Rp) = Parent- or self-report; † = Study used data from the Early Childhood Longitudinal Study — Kindergarten Cohort (ECLS-K).

## The Problem of Directionality

A dearth of knowledge regarding the directionality of the relation between language and depression calls for increased research in this area. To the author's knowledge there is no existing theory or framework that explains the association between language skills and depression in youth. This poses barriers to (a) conceptualizing the pathways connecting language and depression in Latino youth, and (b) discussing related risk and protective factors unique to this population. The next sections explore existing hypotheses that may serve in conceptualizing the directionality of the relation between language and depression in Latino youth.

**Language predicting depression.** The Multiple Code Theory (MCT; Bucci, 1984) suggests that language plays an important role in referential activity, or an individual's ability to use words to represent inner psychological experiences. This ability is generally important for expressing inner psychological experiences to the self (epistemic function) and to others (communicative function). Şimşek (2013) has built upon the MCT to hypothesize that when language fails to serve these functions, there is a gap between language and

experience. Increased gaps between language and experience, thus place an individual at a greater risk for depression (Şimşek, 2013).

Language has also been identified as a “critical phenomenon in mental illness” (Şimşek & Kuzuku, 2012, p.468), because it allows for reflexive thinking and emotional encoding. Given that emotion regulation processes begin at an early age, the maternal tongue (i.e., first language learned) plays an important role in psychosocial outcomes. In dual language youth, for example, retaining the maternal tongue has been observed as a protective factor against maladaptive outcomes (Toppelberg & Collins, 2010). Nonetheless, competence in the maternal language only appears to be protective when combined with competence in the school language (Nguyen, Rawana, & Flora, 2011). For instance, dual language proficiency has been associated with higher self-esteem and better concentration at school (Perez, 2011). Additionally, in a study with Latino kindergarteners, dual language proficiency in both English and Spanish was strongly associated with interpersonal, intrapersonal, and affective strengths (Collins et al., 2011). The authors suggest that children who are better able to navigate different contexts in their respective languages are better able to adjust and form relationships. Building stronger relationships both at home and school, in turn, results in better adjusted children (Han, 2010). Thus, suggesting that each language plays an important role in organizing experiences and serving epistemic and communicative functions both at home and at school.

Proficiency in the school language is also conducive to higher academic achievement (Eamon, 2005) and better adaptive skills in learning environments

(Dowdy, Dever, DiStefano, & Chin, 2011). For instance, English language proficiency has been associated with higher reading and mathematics scores among Latino youth (Eamon, 2005). Lower achievement in reading and mathematics scores, however, has been linked to depression in the same population (Zychinski & Polo, 2012). In the latter study, self efficacy was found to mediate the relation between standardized academic achievement scores and depression. It is conceivable, thus, to observe these relations as a cascading effect whereby diminished language proficiency impacts academic performance, which leads to an increased risk for depressive symptoms (Moilanen, Shaw, & Maxwell, 2010). For Latino children and adolescents, language status may also be an acculturative stressor (Dawson & Williams, 2008; Nair, Roosa, & Zeiders, 2013) leading to adjustment difficulties. Extant research has used self-report measures of language proficiency as proxies for acculturative stress, and findings show an association between self-reports of proficiency and internalizing symptoms among Latino youth (e.g., Gonzales et al., 2006; Nair et al., 2013). In a study with Latino adolescents, self-reported Spanish proficiency was associated with higher anxiety symptoms, particularly, harm avoidance (Martinez, Polo, & Carter, 2012). It is conceivable, thus, that youth who perceive their language status as a stressor will also exhibit difficulties with socialization both at home (Gonzales et al., 2006) and at school.

**Depression predicting language.** It is also conceivable that depression interferes with bilingual language acquisition and production because attentional difficulties may hinder language acquisition and development (Toppelberg et al.,

2006b; Toppelberg et al., 2002). The resource allocation hypothesis posits that cognitive impairments associated with depression lead to deficits in memory and other effortful cognitive processes (Gotlib & Joormann, 2010). Studies with moderate to severely depressed adults show that impaired cognitive functions affect attention, memory, visuomotor speed, and language (Ravnkilde et al., 2002). Poor behavioral adjustment may also interfere with language development when youth are too self-consumed to place any efforts into improving language abilities (Bornstein, Hahn, & Suwalsky, 2013). Language has also been proposed as a diagnostic marker in depressed individuals (Pennebaker & Seagal, 1999).

To date, the existing literature has focused on language use and/or proficiency as predictor(s) of mental health variables (see Table 1). To the author's knowledge there is no evidence of mental health variables (e.g., depression) as predictors of language proficiency, especially among Latino youth. Given the cognitive difficulties often associated with depression, it is imperative to disentangle the directionality of this relation and explore the factors of depression that may hinder language processes. The current study would be the first to address this need by examining the bidirectional relation between language proficiency and depression in a sample of Latino youth.

### **Rationale**

In summary, the association between language proficiency and psychopathology has been well documented in monolinguals and individuals with SLI. There is evidence to suggest a similar association in dual language Latino youth. To date, only a limited number of studies have found associations between

language proficiency and internalizing symptoms in bilingual samples; however, there are several limitations to these findings. A vast majority are either based on early childhood samples or on clinical samples without the inclusion of control groups. Therefore, it is still unknown whether findings with community samples of young children also extend to adolescents. It is also unknown whether associations between language and depression exist exclusively in adolescents with clinically significant symptomatology. In addition, predictive relations may change over time when certain risk factors become more salient than others. What is stressful about language status at school entry may not be the same during middle school or high school. Further, and most importantly, there is no indication of the directionality of the relation between language and depression; making mediational and moderational conceptualizations increasingly difficult.

Currently, there is little knowledge about the language trajectories of Latino adolescents in the US and how changes in proficiency across languages impact their psychosocial well-being. Previous cross-sectional studies have reported associations between Spanish and English self-reports of language proficiency and Latino youth adjustment (Polo & Lopez, 2009). However, research has not examined formal assessments of language proficiency, and how they may relate to specific factors of depression in Latino youth. Further, the directionality of this relation remains elusive; prompting its evaluation as a necessary first step in expanding the literature. Therefore, this study investigated the directionality of the relation between formal assessments of language proficiency and depression in dual language Latino adolescents. Additionally, it

evaluated the language skills trajectories of dual language Latino youth. Study aims were divided into four research questions. The first two aims of the study utilized cross-sectional data. Longitudinal data were employed for aims three and four.

### **Statement of Hypotheses**

**Research question I.** What are the Spanish and English oral language skills among a sample of predominantly low income early adolescent Latinos? Overall computed grade levels will be presented. In addition, youth will be classified into one of four groups, including English Proficient (EPY), Spanish Proficient (SPY), Dual Proficient (DPY), and Limited Proficient (LPY). Fourfold language typologies like the one proposed in this study have been evaluated before with youth of immigrant backgrounds (e.g., Portes & Hao, 2002; Collins et al., 2014). Therefore, providing support for the use of four categories in describing language proficiency profiles. Proficiency groups in this study will be determined based on the guidelines proposed by Collins and colleagues (2014). Grade-appropriate performance will be defined by scores falling within one standard deviation (15) of the mean standard score (SS; 100). As such, participants will be considered DPY if SS for both English and Spanish tests are at, or above, 85. EPY status will be defined by an English Oral Language Standard Score (English OL SS) of  $\geq 85$  and a Spanish Oral Language Standard Score (Spanish OL SS) of  $< 85$ . Likewise, SPY status will be defined by a Spanish OL SS of  $\geq 85$  and an English OL SS of  $< 85$ . LPY status will be defined by having both Spanish OL SS and English OL SS be  $< 85$ .

**Hypothesis Ia.** A majority of the sample is expected to be English dominant. In other words, a majority of the participants will have significantly higher English language skills than Spanish skills. Overall language dominance will be determined using a paired samples t-test.

**Hypothesis Ib.** It is expected that the majority of students (>50%) will not be proficient in both languages. In other words, they may be below proficiency in both or at least one of the two languages. Basic descriptive statistics will be used to examine language profiles of Latino youth in the sample.

**Research question II.** Are there differences in depressive symptoms across oral language proficiency categories?

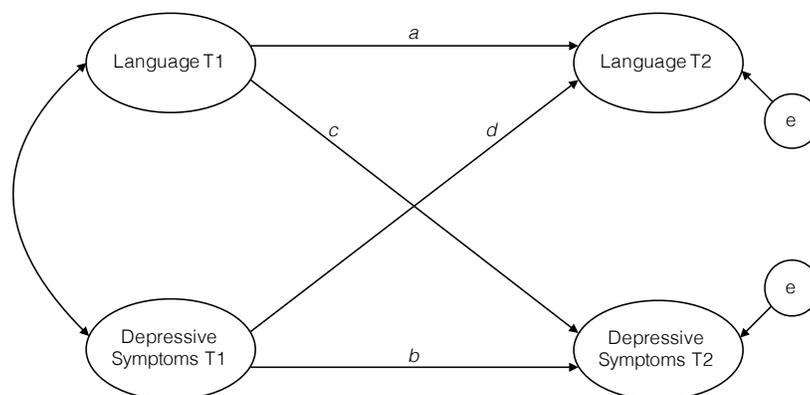
**Hypothesis II.** DPY are expected to report the lowest levels of depressive symptoms compared to all other groups. A one-way between-subjects ANOVA will be used to test differences in depressive symptoms across dual language profiles. Post-hoc tests will be employed to find specific differences between means.

**Research question III.** What are the changes in oral language skills of Latino early adolescents over the course of approximately one year? Changes in oral language scores will be evaluated to determine the gains or losses in both Spanish and English among youth in the sample. Gains will be interpreted as increases in raw scores coupled with stability (or increases) in SSs. No gains will be interpreted as stability in raw scores coupled with decreases in SSs. Losses will be interpreted as decreases in both raw scores and SSs.

**Hypothesis III.** It is predicted that, relative to English proficiency scores, Spanish proficiency scores will be characterized by smaller gains or greater losses. In other words, subtractive bilingualism is expected to be evident. For example, an increase in English language skills will be expected, to be coupled by no gains or losses in Spanish proficiency over time. Paired sample t-tests on the difference of scores will be used to examine language trajectories across time, to determine whether or not there are significant changes in both mean raw and mean SSs from Time 1 (T1) to Time 2 (T2). T-tests will be employed separately with Spanish language scores and English language scores. Differences will also be examined by subtests (i.e., Picture Vocabulary and Verbal Analogies) for each language, for a total of eight t-tests.

**Research question IV.** Is there a longitudinal, reciprocal relation between language proficiency and depression? Do baseline oral language skills scores predict changes in depression symptom scores? Do depressive symptom scores predict changes in oral language skills scores?

**Hypothesis IV.** The relation between depression and language proficiency is expected to be reciprocal, with both variables affecting each other. There will be evidence in support of simultaneous causal paths, with baseline depression scores predicting changes in oral language skills and baseline oral language skills scores predicting changes in depressive symptoms scores (see Figure 1).



*Figure 1.* Hypothesis IV: Cross lagged model of the relation between language and depressive symptoms.

Cross-lagged panel analysis, a type of structural equation modeling (SEM) will be used to examine the relation between language proficiency and depressive symptoms. Cross lagged panel analysis is a statistical modeling technique that allows for the exploration of causal and reciprocal relations with panel data. In a two-wave cross-lagged model, each variable at T2 is being predicted by its previous value as well as the T1 value of a second variable of interest (Finkel, 1995). Conceptual model design and analyses will be conducted using Amos 21.0. Three models will be tested to evaluate Hypothesis IV. Depression symptomatology will be represented across models by a latent construct comprised of five indicators, one for each subscale of the CDI. The first model (see Figure 2) will include an oral language proficiency latent construct comprised of four indicators: English Picture Vocabulary Standard Score (English PV SS), English Verbal Analogies Standard Score (English VA SS), Spanish Picture Vocabulary Standard Score (Spanish PV SS), and Spanish Verbal Analogies Standard Score (Spanish VA SS); and the depression latent construct.

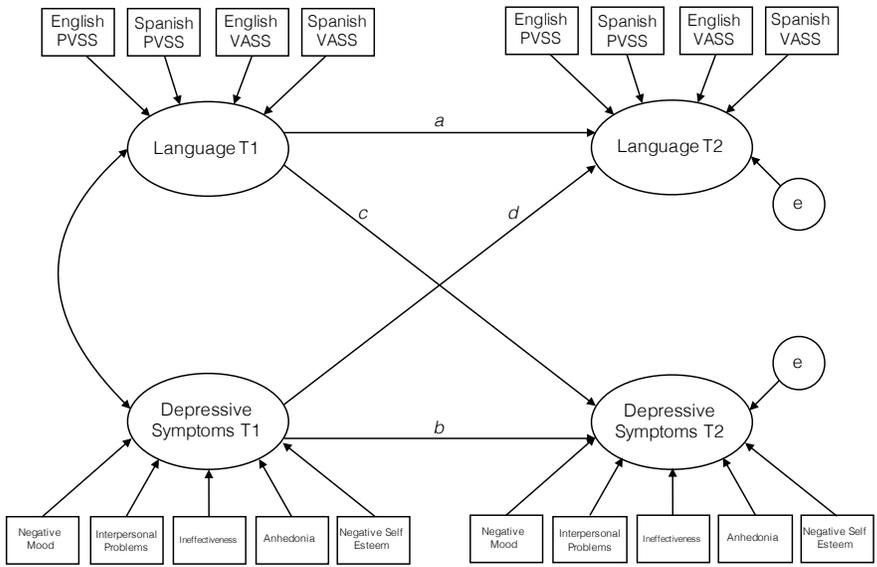


Figure 2. Cross lagged model of the relation between the combined English Spanish oral language skills and depressive symptoms.

The second model (see Figure 3) will include an English language proficiency latent construct comprised of two indicators: English PV SS and English VA SS, and the depression latent construct.

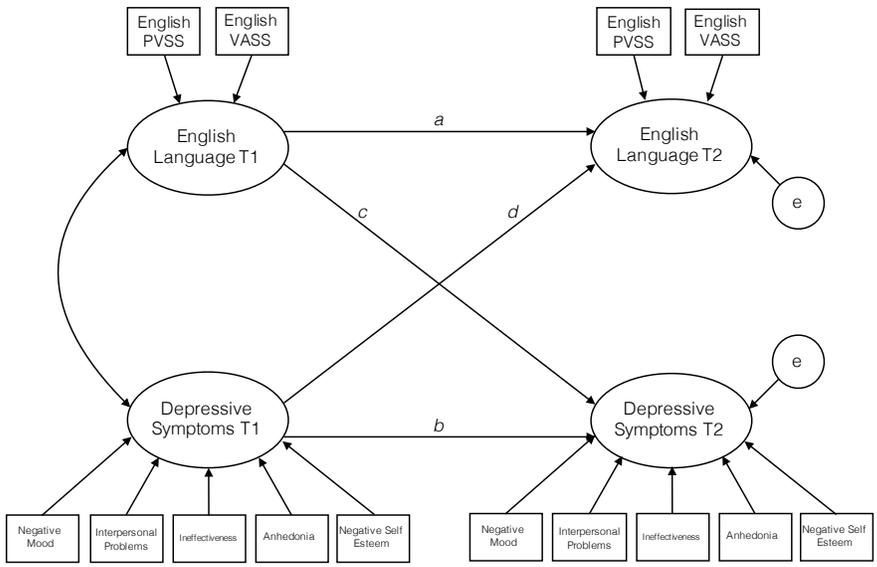
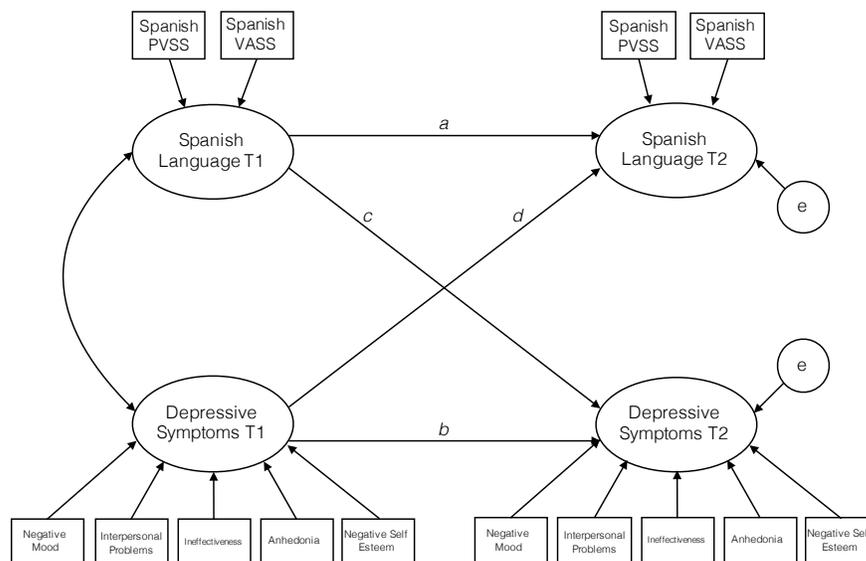


Figure 3. Cross lagged model of the relation between English oral language skills and depressive symptoms.

The third model (see Figure 4) will include a Spanish language proficiency latent construct comprised of two indicators: Spanish PV SS and Spanish VA SS, and the depression latent construct.



*Figure 4.* Cross lagged model of the relation between Spanish oral language skills and depressive symptoms.

Error terms in the models have been trimmed for simplicity purposes. All variables in the models will include error terms during analyses. The models will be tested following the guidelines suggested by Cole and Maxwell (2003). Fit for each model will be assessed using multiple fit indices. These include, but are not limited to, the global chi-square ( $X^2$ ) goodness of fit test, the comparative fit index (CFI), the Tucker Lewis index (TLI), the root mean square error of approximation (RMSEA), and the 90% confidence interval (90% CI) around the RMSEA. The existence of a reciprocal relation will be determined by the significance of paths *c* and *d* (see Figure 1). Both paths are expected to be significant in all three models, indicating that language at T1 is predictive of depressive symptoms at T2, and depressive symptoms at T1 are predictive of language at T2. Significant

autoregressive effects on paths *a* and *b* are also expected in each of the three models.

## Method

### Participants and Design

Participants for the current study are 397 Latino students and their parents. Recruitment occurred at nine public schools in Chicago, Illinois. The study includes data from in-person interviews conducted at two time points (hereafter T1 and T2). At T1, participants were 397 Latino students ages 10-15 years ( $M = 12.0$ ;  $SD = 1.0$ ; 51.9% female) enrolled in 5th through 7th grades. Students reported being of Mexican American (65.0%), Puerto Rican (11.1%), Central/South American (5.8%), and mixed Latino (18.1%) backgrounds. Regarding nativity, 88.7% of students reported being born in the US, and 11.3% reported being born in other country. On average, students born in other country had been living 7.6 years in the US. According to parental reports, 24.4% of mothers were born in the US, while 69.5% were born in other country. On average, mothers born in other country had been living 18.9 years in the US. Nativity data for 6.0% of mothers were not available. Families reported being of primarily low socio-economic backgrounds. The modal annual household income was reported as falling between \$20,000 and \$30,000. A majority (82.4%) reported an annual household income below \$40,000. At T1, 25.4% of participants scored at or above 13 in the Children's Depression Inventory (CDI) and were considered to be at risk for depression. More than half of the sample (55.4%,  $n = 220$ ) was followed longitudinally at T2. About one in 10 (9.0%) of

youth were reportedly receiving services for emotional or behavioral issues and 17.0% scored at or above 13 in the CDI at T2. Two participants were not included in longitudinal analyses because language assessments could not be completed, therefore reducing the final T2 sample to 218 participants. Chi-squares and t-tests were conducted to evaluate differences between those who participated in T1 and T2 ( $n = 218$ ) and those who only participated in T1 ( $n = 179$ ). Results revealed significant differences between the two groups for age,  $X^2(5, N = 397) = 22.3, p < .01$  and T1 English OL SSs,  $t(395) = 2.5, p < .05$ . Specifically, youth who participated in T1 and T2 were older and had lower English language skills than those who only participated in T1. The two groups did not differ significantly in gender, mother nativity, student nativity, family income, T1 depression scores, or T1 Spanish OL SSs.

## Measures

**Depressive symptoms.** The Children's Depression Inventory (CDI; Kovacs, 1985) is a commonly used depression scale for children and adolescents aged 7-18 years. This self-report measure comprises 27 items and assesses cognitive, behavioral, and affective symptoms of depression. For each item, the respondent selects one of three statements describing how s/he may have felt during the past two weeks (e.g., "I am sad once in a while, I am sad many times, I am sad all the time"). To prevent reckless response patterns, response options are not ordered according to symptom severity. Items are rated on a 0-2 scale, and the range of possible scores is 0-54. Symptoms are factored into five subscales, including Negative Mood, Interpersonal Problems, Ineffectiveness, Anhedonia,

and Negative Self Esteem. Item 9, which assesses suicidality, was eliminated from the questionnaires due to concerns that the research team would not be able to evaluate risk for suicide among those students who might have endorsed suicidality during the group survey administration. Total scores were calculated without this item. The CDI was collected at T1 ( $\alpha = .90$ ) and T2 ( $\alpha = .89$ ; see Procedures section for details).

**Language proficiency.** The Woodcock Muñoz Language Survey - Revised (WMLS-R; Alvarado, Ruef & Schrank, 2005) was used to assess verbal proficiency and lexical knowledge. The WMLS-R battery includes seven subtests of which two were employed in this study: Picture Vocabulary and Verbal Analogies. The combination of these subtests yields an oral language proficiency score. Picture Vocabulary measures aspects of oral language, including language development and lexical knowledge. The task requires the subject to identify pictured objects (e.g., to respond to the question, “What is this?,” when presented with a picture of a bookshelf). Verbal Analogies measures the ability to reason using lexical knowledge. The task requires listening to three words of an analogy and then completing the analogy with an appropriate fourth word (e.g., “One is to two as three is to...?”). Subtests were administered in English and Spanish language by trained researchers. Two versions (Version A and Version B) were used in the studies. Versions are equivalent in nature and follow the same procedures. The only difference lies in the images used for Picture Vocabulary section and the analogies used for the Verbal Analogies section. The WMLS-R has been normed with over 8,000 individuals across 100 settings and generally

yields high internal consistency values ( $\alpha = .73-.89$ ). The samples used for norming included primarily monolingual individuals from the US, Canada, Spain and several Latin American countries. The WMLS-R authors also administered the measure with a smaller sample of bilingual individuals as part of the norming procedures. However, norms are not separately provided for youth from the US or youth who are bilingual.

**Mental health services utilization.** The Service Assessment for Children and Adolescents-Parent Version (SACA; Horwitz et al., 2001) is a 30-item questionnaire used to obtain information about mental health services utilization. It assesses four types of service use: global service use for any service use, inpatient care, outpatient care, and school services. If parent endorses any service utilization during his or her child's lifetime, follow-up questions about time, length of service use, and current use are asked. If parent does not endorse any service use, follow up questions about perceived need for services and reasons for underutilization are asked. This study only focused on current services reported at T1 and intervention participation between T1 and T2 to control for any effects produced by service utilization during the study. The SACA has demonstrated good accuracy, with up to perfect concurrence ( $\kappa = 1.00$ ) reported between parent reports and official service records (Hoagwood et al., 2000). The SACA was administered during in-person interviews at T1 and T2.

**Demographics.** Parents and students were asked basic demographic information. Parents were asked to report on family household income, youth and parental nativity, length of time parent and child have resided in the US (among

foreign-born), and ethnicity. Youth were asked to report on their age, grade, nativity, and ethnicity.

### **Procedures**

Students in the 5th, 6th, and 7th grades ( $N = 1,537$ ) were recruited in their classrooms for a survey as part of a larger longitudinal study evaluating an intervention. Students were told that the purpose of the study was to gain a better understanding of the kinds of feelings and thoughts students of their age are experiencing. Each student was asked to take informed consent packets home for their parents to review and return, indicating their decision about participation. All information in the packets was provided in both English and Spanish languages. Surveys were administered in the classroom in English, with a few exceptions when students were not fluent. In those cases, a bilingual administration was used in which all items were read in both English and Spanish. Survey responses were used, in part, to over-sample students at risk for depression who might be eligible for the intervention. The parents of participating students were later invited to in-person, two-hour interviews. A total of 397 Latino families participated in the interviews.

Before the interviews, study personnel read and went over parent consent and student assent forms, which were then signed by participants indicating their agreement to participate in the interviews and the study. Parent and student interviews were conducted simultaneously but in separate rooms by trained interviewers. Student interviews included administration of the WMLS-R Version A in English and Spanish. All parts of the interviews were completed orally, by

having interviewers read the items and questions out loud and asking the participants to respond verbally and with the use of response scales presented in a booklet. After completing each interview, students received a \$25 gift card, and parents received \$30 for their participation.

Of the 397 families who participated in the initial in-person interview, 220 (55.4%) participated in the follow-up interview which took place, on average, approximately one year after the first interview. The same procedures used for the initial interviews were used for the follow-up interviews. Version B of the WMLS-R was used for the follow-up interview to prevent any practice or priming effects from previous exposure to the test.

## **Results**

### **Spanish and English Oral Language Skills**

Grade-based measures of language proficiency were obtained from the WMLS-R NU scoring and reporting software (Schrank, McGrew, & Dailey, 2010). Standard scores were obtained for each subtest (i.e., PV and VA), and language (i.e., Spanish OL SS and English OL SS). The SS provided by the WMLS-R NU reporting software describes an individual's standing in a group, thus accounting for both age and gender. Participants were classified into four groups based on their proficiency levels in each language.

Profiles are shown in Table 2. As predicted, a majority of the sample (58.9%) were English, but not Spanish proficient, and were therefore classified as EPY. In other words, their English OL SSs were at, or above, 85, while their Spanish OL SSs were below 85. About one in three students did not show

differential proficiency in English or Spanish (their SSs were within 15 points of each other). Over one fifth (21.7%) of these students fell in the LPY group; they scored below 85 in their SSs in both languages. A smaller group of students were classified as proficient in both Spanish and English (scored at, or above, 85 in both languages), and formed the DPY group (13.4%). Finally, the smallest group of students belonged to the SPY group (6.0%). These students were found to be Spanish, but not English proficient. Their Spanish OL SSs were at, or above, 85 points, while their English OL SSs were below 85 points.

Table 2  
*Language Profiles*

Group	Percent	<i>M(SD)</i>		<i>n</i>
		English OL SS	Spanish OL SS	
EPY	58.9%	95.7 (7.7)	52.6 (29.6)	234
LPY	21.7%	76.5 (6.1)	64.7 (22.6)	86
DPY	13.4%	96.0 (7.7)	90.1 (4.6)	53
SPY	6.0%	68.2 (23.5)	90.4 (5.7)	24

*Note.* EPY = English Proficient Youth, LPY = Limited Proficient Youth, DPY = Dual Proficient Youth, SPY = Spanish Proficient Youth, English OL SS = English Oral Language Standard Score, Spanish OL SS = Spanish Oral Language Standard Score.

A paired samples t-test was conducted to compare mean SSs for English and Spanish for the overall sample at T1. As predicted, there was a significant difference between the English ( $M = 89.9$ ,  $SD = 13.2$ ) and Spanish ( $M = 62.5$ ,  $SD = 29.0$ ) scores,  $t(396) = 15.92$ ,  $p < .001$ . Also as expected, a majority of the sample (86.6%) did not exhibit grade-appropriate levels of proficiency in both languages. Of note, over one fifth of the sample (21.7%) did not exhibit proficiency in *either* language. In terms of gender, males ( $M = 91.5$ ) showed higher levels of language proficiency in English, compared to females ( $M = 88.4$ );  $F(1, 395) = 5.47$ ,  $p < .05$ . These gender differences in English language SSs were



PV T1														
5. Spanish VA T1	-.22**	.02	-.13**	.92**	--									
6. Spanish OL T1	-.28**	-.07	-.21**	.99**	.99**	--								
7. Dep Symp T1	-.002	-.09	-.04	-.11*	-.13**	-.13*	--							
8. English PV T2	.80**	.66**	.79**	.32**	-.20**	-.28**	.01	--						
9. English VA T2	.62**	.65**	.69**	.003	.14*	.05	-.07	.66**	--					
10. English OL T2	.79**	.71**	.82**	-.19**	-.05	-.14*	-.03	.93**	.89**	--				
11. Spanish PV T2	-.31**	-.10	-.24**	.93**	.86**	.93**	-.15*	-.33**	.00	-.20**	--			
12. Spanish VA T2	-.17*	.07	-.07	.87**	.90**	.90**	-.20**	-.16*	.18**	-.01	.90**	--		
13. Spanish OL T2	-.27**	-.04	-.18**	.93**	.89**	.94**	-.18**	-.27**	.07	-.13	.98**	.96**	--	
14. Dep Symp T2	-.02	-.10	-.07	-.08	-.16*	-.11	.60**	-.11	-.20**	-.17*	-.10	-.16*	-.13	--

*Note.* All language variables represent SSs. PV = Picture Vocabulary, VA = Verbal Analogies, OL = Oral Language, Dep Symp = Depressive Symptoms, T1 = Time 1 ( $n = 397$ ), T2 = Time 2 ( $n = 218$ ). \* $p < .05$ , \*\* $p < .01$ .

### Language Profiles and Risk for Depression

A one-way between-subjects ANOVA was conducted to compare the youth depressive symptoms scores across language profiles (i.e., DPY, EPY, SPY, LPY). There was a significant difference across groups,  $F(3, 393) = 2.82, p < .05$ . This difference remained after entering gender as a covariate in the model,  $F(3, 392) = 3.78, p < .05$ . Post hoc comparisons using the Least Significant Difference (LSD) test indicated that the mean depression score for the LPY group ( $M = 10.6, SD = 7.9$ ) was significantly different from the scores for the DPY ( $M = 7.3, SD = 8.2$ ) and SPY ( $M = 6.6, SD = 6.3$ ) groups. However, no significant differences in depressive symptom scores were found between the LPY and EPY groups. Consistent with predictions, post hoc comparisons revealed that DPY had significantly lower mean depression scores, compared to LPY, although it did not differ from EPY and SPY. SPY was also found to be significantly lower in depressive symptoms compared to LPY. Taken together, these results suggest

that, at T1, Latino youth with limited language proficiency in both English and Spanish languages are at a higher risk for depression compared to youth with either dual or Spanish proficiency.

### Language Trajectories

Paired samples t-tests on the difference between language proficiency scores were employed to examine language trajectories over a one-year period. Table 5 presents results for PV and VA SSs in both English and Spanish. Mean differences (i.e., T1 – T2) show a trend towards language growth for PV in Spanish, and VA in both languages. However, changes in SSs only reached significance for English PV and Spanish VA. Specifically, over a period of one year, participants' expressive (i.e., PV) English language abilities did not appear to improve while their receptive (i.e., VA) Spanish language abilities appear to have increased. In other words, their vocabulary in English remained stagnant, while their ability to understand and process the Spanish language improved.

Table 5  
*Changes in Standard Scores Over Time*

Pair	Mean	SD	t	df	Sig. (2-tailed)
English PV T1 – English PV T2	2.4	8.4	4.27	217	<.01
English VA T1 – English VA T2	-1.0	8.6	-1.73	217	.09
Spanish PV T1 – Spanish PV T2	-.1	10.6	-.16	217	.87
Spanish VA T1 – Spanish VA T2	-1.2	8.2	-2.19	217	.03

*Note.* PV = Picture Vocabulary, VA = Verbal Analogies, T1 = Time 1, T2 = Time 2.

Changes in language proficiency were also evaluated using raw scores, given that a lack of growth in SSs may not reflect significant changes but still suggest an appropriate rate of language growth. In other words, a child that scores 100 at both time points may not show changes in SS, but still show appropriate

growth in language by remaining on the average range over time. Results for English and Spanish PV and VA raw scores are presented in Table 6.

Table 6  
*Changes in Raw Scores Over Time*

Pair	Mean	SD	t	df	Sig. (2-tailed)
English PV T1 – English PV T2	-.4	3.4	-1.9	217	.06
English VA T1 – English VA T2	-1.2	3.1	-5.7	217	<.001
Spanish PV T1 – Spanish PV T2	-1.3	4.5	-4.3	217	<.001
Spanish VA T1 – Spanish VA T2	-1.3	3.4	-5.8	217	<.001

*Note.* PV = Picture Vocabulary, VA = Verbal Analogies, T1 = Time 1, T2 = Time 2.

Results from raw scores align with results from SSs in several ways. First, greater gains are observed in VA, compared to PV. Second, mean differences between raw scores suggest growth for both PV and VA in Spanish, and VA in English. Mean differences also point in the direction of growth for English PV, although this difference is non-significant. This non-significant change in raw score aligns well with the results of the SSs t-test. It suggests that a lack of improvement in raw score results in a decrease in SS over time. This decrease in SS may be interpreted as a lack of significant growth in English vocabulary skills. Changes in Spanish PV and English VA reached significance; a finding that stands in contrast with the SS t-tests. This finding suggests significant growth in language for Spanish VA and PV, and English VA. Taken together, results from standard and raw scores suggest a trend towards language growth across tests with significant improvement in Spanish (especially VA) and much less growth (perhaps stagnation) in English (especially PV). This finding is rather surprising given that students had instruction in English for one year and no formal schooling outside of the home in Spanish.

### Cross-lagged Panel Models

Three models evaluated hypotheses that language proficiency and depressive symptoms are reciprocally related across time. The first model tested this reciprocal relation using scores for combined English and Spanish OL skills. The second model tested the relation using scores for English OL skills only. Finally, the third model evaluated the same relation using scores for Spanish OL skills only. Each model examined cross-lagged paths from language proficiency to depressive symptoms and depressive symptoms to language proficiency (i.e., reciprocal pathways).

SEM models are generally considered to fit the data well if the  $X^2$  is not significant ( $p > .05$ ), the CFI and the TLI are above .90, the RMSEA value is below .08, and the 90% CI lower value includes or is near to zero and the upper value is less than .08. Fit statistics for each model are provided in Table 7.

Table 7  
*Model Fit Statistics*

Model	Fit Statistics				
	$\chi^2$	df	CFI	TLI	RMSEA (90% CI)
Model 1†	930.07	165	.75	.71	.15 (.14, .16)
Model 2	211.19	99	.93	.92	.07 (.06, .09)
Model 3†	241.86	72	.93	.91	.10 (.09, .12)

*Note.* † = Not a good fitting model.

The models were run with and without control variables (i.e., nativity, gender and service use during the time period evaluated) to test their fit. Service use was divided into “current service use” as reported by parents at T1, and “participation in an intervention” between T1 and T2. Both nativity and participation in an intervention turned non-significant regression weights in all three models, and were therefore removed. Both current service use and gender

regressed on to T1 depressive symptoms in Models 1 and 2, and were kept in those models. The error terms for the constructs of language and depression were allowed to covary at T1.

Model 1 (see Figure 5) evaluated the reciprocal relation between combined English and Spanish OL, and depressive symptoms over a period of one year. This model did not provide a good fit to the data,  $\chi^2(165) = 930.07$ ,  $p < .001$ , CFI = .75, TLI = .71, RMSEA = .15 (90% CI [.14, .16]). Both language ( $\beta = .97$ ,  $p < .001$ ) and depressive symptoms ( $\beta = .68$ ,  $p < .001$ ) were stable between time points (i.e., pathways *a* and *b*). However, language at T1 did not predict depressive symptoms at T2 ( $\beta = .02$ ,  $p = .80$ ; i.e., pathway *c*). Likewise, depressive symptoms at T1 were not predictive of language at T2 ( $\beta = -.01$ ,  $p = .76$ ; i.e., pathway *d*). Regarding covariates, both gender ( $\beta = .20$ ,  $p < .05$ ) and current service use ( $\beta = .22$ ,  $p < .05$ ) impacted depressive symptoms at T1, such that depressive symptoms were higher among females and students currently participating in services. This was also the case for Model 2. Due to poor model fit, no further interpretation is warranted or appropriate for Model 1.

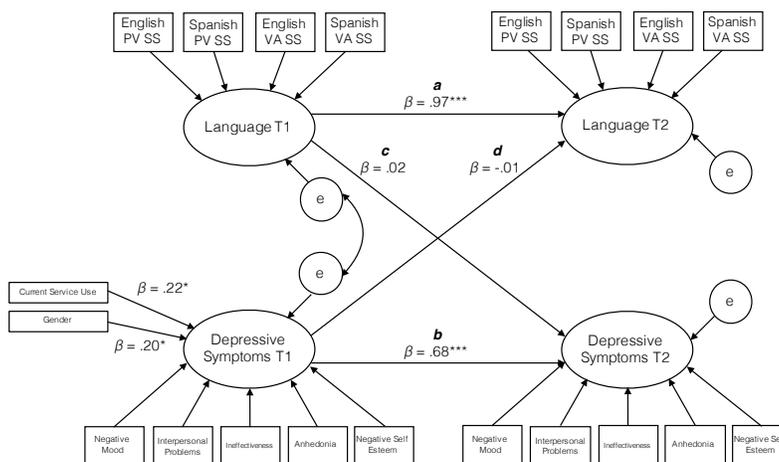


Figure 5. Model 1 (not a good fit) with standardized regression weights.  $*p < .05$ ,  $***p < .001$

Model 2 (see Figure 6) evaluated the reciprocal relation between English OL, and depressive symptoms over a period of one year. This model was found to fit the data well,  $\chi^2(99) = 211.19, p < .001$ , CFI = .93, TLI = .92, RMSEA = .07 (90% CI [.06, .09]). Although the chi-square was found to be significant, the use of this test as a sole indicator of model fit has been highly contested in the literature (e.g., Markland, 2007), and some have described it as having “serious limitations” (Sarlis, Satorra, & Sörbom, 1987). This dichotomous test can be affected by factors such as multivariate non-normality, correlation sizes among observed variables, unique variance, and sample size (Kline, 2016). All are problematic, given that a simple deviation in any of the mentioned factors can deem a model unfit, regardless of its conceptual appropriateness. In this case, the sample under evaluation is above 200 ( $N = 218$ ) and displays multivariate non-normality with kurtosis of 74.1 (CR = 22.8). Both are considered justifiable reasons to obviate a significant chi-square and examine other fit indices. In this model, both language ( $\beta = .99, p < .001$ ) and depressive symptoms ( $\beta = .69, p < .001$ ) showed stability over time (i.e., pathways *a* and *b*). As hypothesized, a cross-lagged relation was found between English OL and depressive symptoms, such that higher English OL scores at T1 were predictive of lower depressive symptoms at T2 ( $\beta = -.13, p < .05$ ; i.e., pathway *c*) and higher depressive symptoms at T1 were predictive of lower English OL scores at T2 ( $\beta = -.10, p < .05$ ; i.e., pathway *d*). These results suggest that as English language proficiency increases by 1.00 standard deviation (SD) depressive symptoms decrease by .13 SD, and as depressive symptoms increase by 1.00 SD, English language

proficiency decreases by .10 SD. Regarding covariates, both gender ( $\beta = .19, p < .05$ ) and current service use ( $\beta = .24, p < .001$ ) were predictive of depressive symptoms at T1.

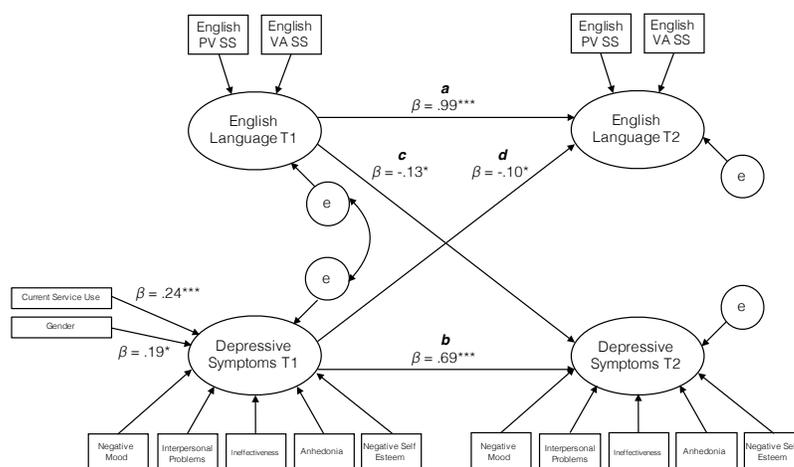


Figure 6. Model 2 with standardized regression weights.

\* $p < .05$ , \*\*\* $p < .001$

Model 3 (see Figure 7) evaluated the reciprocal relation between Spanish OL, and depressive symptoms over a period of one year. This model did not provide a good fit to the data,  $\chi^2(72) = 241.86, p < .001$ , CFI = .93, TLI = .91, RMSEA = .10 (90% CI [.09, .12]). Both language ( $\beta = .98, p < .001$ ) and depressive symptoms ( $\beta = .67, p < .001$ ) were stable between time points (i.e., pathways *a* and *b*). However, language at T1 did not predict depressive symptoms at T2 ( $\beta = -.01, p = .95$ ; i.e., pathway *c*). Likewise, depressive symptoms at T1 were not predictive of language at T2 ( $\beta = -.01, p = .95$ ; i.e., pathway *d*). This model did not include covariates. When added, gender and current service use decreased fit and did not have a significant impact on depressive symptoms at T1. Due to poor model fit, no further interpretation is warranted or appropriate for Model 3.

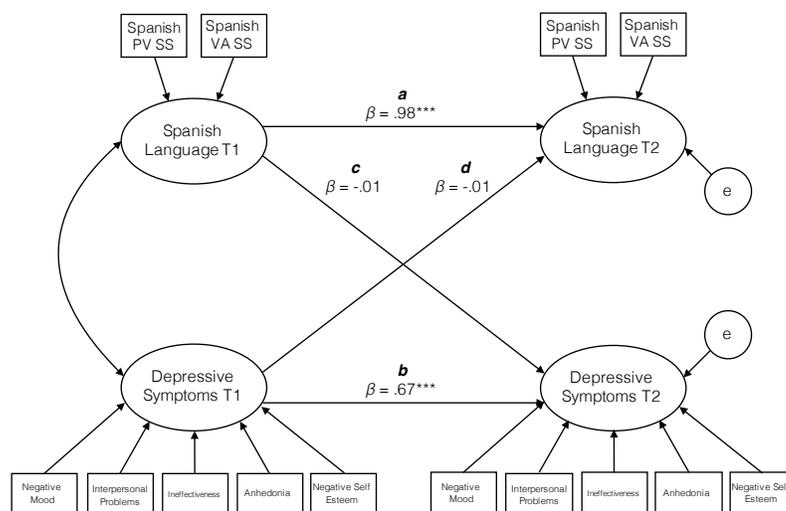


Figure 7. Model 3 (not a good fit) with standardized regression weights.  
 \*\*\* $p < .001$

## Discussion

Research on the relation between dual language proficiency and depressive symptoms among Latino youth has received limited attention. Although a number of studies have assessed both constructs and made valuable contributions to the field, many have evaluated language as a proxy for acculturation (e.g., Gonzales et al., 2006) and employed self-reports of proficiency (e.g., Martinez, Polo, & Carter, 2012). These shortcomings have impacted our ability to gain a clear understanding of the paths connecting more formal indicators of dual language proficiency with mental health, particularly, depression. This study intended to shed light on the path connecting dual language proficiency and depression in Latino youth by providing a snapshot of proficiency levels and the nature of their relation with depressive symptoms. Findings reveal clear associations between language and depression, and suggest multiple avenues of research to continue adding pieces to this puzzle.

### **Cross-sectional Assessment of Language Proficiency**

Results revealed that our sample is mostly dominant in the English language (i.e., exhibits greater skills compared to Spanish). This finding was not unexpected given that 88.7% of the sample was born in the US, and those who were born in another country (i.e., 11.3%) have spent most of their lives ( $M = 7.6$  years) in the US. English language dominance over Spanish language, however, does not imply proficiency.

In this study, more than one in four students (i.e., LPY and SPY combined; 27.7%) do not exhibit appropriate English language skills for their grade. These students scored below one standard deviation from their expected SS based on their grade. These results mirror national trends showing that 26.0% of dual language Latino students speak English with difficulty, or less than “very well” (Pew Hispanic Center, 2008). Results also extend those of a longitudinal study that followed Latino children from preschool to fifth grade and found a gap between national monolingual norms in English language and Latino children’s English language verbal skills (Mancilla-Martinez & Lesaux, 2011). Although dual language students should not be expected to perform at the same linguistic levels as their monolingual peers (Hammer, 2014), underperformance in English oral language has real implications that affect Latino youth because not all school settings support the academic development of dual language learners equally.

Spanish proficiency, as defined by being within one standard deviation from the mean grade-based SS, was found in 19.4% of the sample (i.e., DPY + SPY), or only about one in five students evaluated. In addition, only 6.0% (i.e., SPY)

demonstrated higher oral language proficiency in Spanish compared to English. Although this finding stands in contrast with the fact that a majority of the sample has an immigrant background (69.5% of the mothers were born outside the US), generational language shift is not uncommon among Latino families. It has been found that second and third generation Latinos tend to speak more English compared to first generation Latinos. However, they still understand Spanish spoken by parents or close family members through a phenomenon called linguistic bands. Linguistic bands allow for exposure of Spanish or English to speakers of only one language, strengthening their receptive (but not expressive) skills. Therefore, even when youth speak mostly in English and parents speak mostly in Spanish, they can still understand each other (Hurtado & Vega, 2004). As stated earlier, several factors may also influence Spanish language proficiency, including language use at home, level of family communication, language used at school, and a lack of formal instruction in Spanish at school (Anderson, 2012; Arriagada, 2005).

In addition to overall dominance and proficiency, gender differences in language proficiency were examined. A gender difference in language proficiency was found in our sample, with females performing better in Spanish language tests compared to males, and males performing better in English language tests compared to females. Once maternal nativity was considered, however, only the gender differences in Spanish proficiency remained. Gender differences in language test performance among Latino youth have been reported previously (Lee & Hatteberg, 2015; Arriagada, 2005) and support our findings that Latina

females perform better in Spanish compared to males. This difference extends to both oral language and literary skills (i.e., reading and writing). A recent study with Latino/a English Language Learners found that Latina fifth graders outperformed their male counterparts in a Spanish reading measure. In this study 45.2% of females performed at grade level while only 12.5% of males reached expected performance levels for their grade (Lapayese, Huchting, & Grimalt, 2014). Although assessing a different set of language abilities (i.e., reading vs. verbal), this study suggests Latina girls are better equipped with Spanish language skills compared to Latino boys, and indicates the need for further research into gender differences affecting dual language acquisition and maintenance.

### **Cross-Sectional Assessment of Depressive Symptoms**

Different language profiles were also associated with varying levels of depressive symptoms. Specifically, youth who were classified as LPY were at a higher risk of depression compared to youth with dual proficient (DPY) and Spanish (but not English) proficient profiles. These findings suggest that, despite dominance, diminished language abilities in both languages are associated with mental health in Latino youth. Furthermore, those participants with dual proficiency (DPY) and Spanish proficiency (SPY) appeared to be at a lower risk for depression, suggesting that having grade-appropriate knowledge in either both languages or in Spanish serves a protective function. These results are not isolated. The benefits of dual proficiency have been supported continuously in the literature, and extend to the cognitive, educational, and psychosocial realms (e.g., Castro et al., 2013). Further, a study evaluating mental health and academic

outcomes related to dual language proficiency in migrant European children also found that varying combinations of language proficiency impact mental health outcomes differently (Vuorenkoski, Kuure, Moilanen, Penninkilampi, & Myhrman, 2000). Vuorenkoski and colleagues, however, used survey data and evaluated language proficiency based on reported use.

Correlational analyses also revealed associations between depressive symptoms and language proficiency. Specifically, overall Spanish language proficiency (i.e., PV, VA, OL) was negatively associated with depressive symptoms at T1. Depressive symptoms at T2 were negatively correlated with Spanish and English VA at T1 and T2, and with English OL at T2. These correlations suggest a particularly strong association between depression and verbal reasoning (i.e., VA). This association was observed at both cross-sectional and longitudinal levels; suggesting the importance of verbal reasoning in mental health processes, and the need to assess separate components of language in future studies of dual language and depression. Bornstein and colleagues (2013) had previously discussed the need for individual evaluation of language competencies in relation to mental health, citing the multidimensionality of language. Yet, this had not been explored, particularly in a sample of Latino youth.

### **Longitudinal Assessment of Language Proficiency and Depressive Symptoms**

Results show that language proficiency changed over a period of one year. Specifically, a deceleration in the development of vocabulary in English and an increase in the ability to evaluate analogies in Spanish were detected. Stunted

growth in English vocabulary was not expected and may be explained by several factors including the quality of education at school, and limited exposure to new vocabulary across contexts. Of note, Mancilla-Martinez and Lesaux (2011) followed a sample of low-income Latino dual language children from preschool to fifth grade and found a marked deceleration in English language vocabulary growth starting at age 10. Because their study includes data up to age 11, it is difficult to know the sample's trajectory from that age onward. This study evaluated youth ages 10 to 15 and suggests the deceleration trend continues through middle school. A lack of growth in English vocabulary in a one-year period points to the need for better understanding of ways to increase English language vocabulary development among low-income Latino and dual language youth. In Spanish, continued exposure to the language may have increased the participants' ability to process and understand the language. Finding growth in the receptive domain of Spanish language is surprising given that loss of both expressive and receptive skills is expected in subtractive bilingualism when dual language individuals are immersed in environments that mostly support the development of one language over the other (Anderson, 2012). Anderson (2012) explains that stagnation of Spanish language is expected in environments where there is a "minority-majority language dichotomy" (p. 196) where different values are placed over each language. In the US, for example, higher value is placed in the English language and most schools educate dual language students with the goal of supporting English language learning instead of maintenance of bilingual skills (Castro et al., 2013). Given that a complex web of factors may contribute to

language maintenance and loss (e.g., gender, lack of peer interactions in one language, level of parental bilingualism, early immersion in second language, availability of bilingual programs, language used in the community; Anderson, 2012), it is difficult to point to a specific reason for losses and gains in this sample. More research is needed to understand patterns of use (e.g., at home and school) and other contextual factors, and how they relate to proficiency in both English and Spanish languages. Future research may benefit from evaluating youth beyond one year and examining the significance of language loss in academically meaningful ways (e.g., impact on academic performance, standardized testing, school placement, and graduation rates).

Shedding light on dual language development among Latino youth is imperative to better tailor both psychological services and academic programs for this population. This study has taken an important first step in this direction by examining the longitudinal relation between English and Spanish language proficiency and depressive symptoms. Results suggest that although Spanish proficiency is correlated with lower depressive symptoms at cross-sectional and longitudinal levels, only English proficiency is a significant predictor of changes in depressive symptoms longitudinally. Cross-lagged panel models suggest that over time, English language proficiency is predictive of changes in depressive symptoms and vice-versa. Specifically, as English language proficiency increases by 1.00 SD depressive symptoms decrease by .13 SD, and as depressive symptoms increase by 1.00 SD, English language proficiency decreases by .10 SD. Previous studies with monolingual children have also found associations

between language and internalizing symptoms using cross-lagged analyses. Bornstein and colleagues (2013) found that internalizing symptoms at age 10 were predictive of English language at age 14 in a sample of formally-assessed European American children. In this study, English language at age four was also predictive of internalizing symptoms at age 14. Although longitudinal associations between English language and internalizing symptoms have been previously reported among Latino children (Dawson & Williams, 2008; Han, 2010), no study had evaluated longitudinal associations in middle school Latinos. This study fills this gap and provides strong evidence in support of a connection between language proficiency and depression in Latino youth. A plethora of variables may play a role in explaining these longitudinal associations. Challenges unique to Latino youth are explored in the next sections.

**Language predicting depression.** According to the Multiple Code Theory (MCT; Bucci, 1984), language plays an important role in an individual's ability to represent inner psychological experiences with words to the self (epistemic function) and to others (communicative function). Following this theory, difficulties in putting thoughts or feelings into words, have been hypothesized to increase an individual's risk for depression (Şimşek, 2013). This study has found support for this theory and direction of effect; suggesting the need for further exploration of factors contributing to this relation. In Latino youth, an inability to express important thoughts, feelings, or concerns to others in the English language may impact their ability to represent experiences, communicate needs, and access support. At home, language may play an

important role in facilitating communication among family members. Family conflict, for instance, has been found to mediate the relation between increased knowledge and use of English language and depressive symptoms among Mexican American youth (Gonzales et al., 2006). Among peers, English proficiency may serve an important communicative function, increasing opportunities for healthy relationships and important interactions, particularly during early adolescence. The opposite may also be true if communication in English becomes a stressor for youths. For instance, hassles with the English language coupled with peer discrimination at school have been found to predict internalizing symptoms over time among Mexican American youth (Nair et al., 2013). Knowledge of the English language may also serve a protective role by promoting higher academic achievement (Eamon, 2005) and better adaptive skills in learning environments (Dowdy, Dever, DiStefano, & Chin, 2011). It is possible that success in academic settings may mediate the relation between English proficiency and depressive symptoms by way of increasing self-confidence and maintaining emotional well-being, and future studies that incorporate academic functioning may further shed light into these relations.

**Depression predicting language.** To date the vast majority of research has focused on language as a predictor of depression; ignoring the alternative possibility that depression may predict language. Findings in this study provide evidence to support the resource allocation hypothesis and the existing literature suggesting that depressive symptoms may impact language development by posing attentional difficulties that hinder a student's ability to learn, process, and

produce (Toppelberg et al., 2006b; Toppelberg et al., 2002). The resource allocation hypothesis posits that cognitive impairments associated with depression lead to deficits in memory and other effortful cognitive processes, including language (Gotlib & Joormann, 2010). Future research may focus on the impact of depression diagnosis, rather than symptoms, on future functioning and language skills. Other mechanisms may also describe the predictive relation between depression and language. Poor behavioral adjustment and other externalizing symptoms associated with emotional difficulties may also interfere with language learning (Bornstein, Hahn, & Suwalsky, 2013). Additionally, depressive symptoms with higher rates of endorsement among Latino youth (e.g., increased somatization and higher levels of self-deprecating thoughts; Taylor et al., 2014) may also play a role in the association between depression and language. For instance, higher levels of somatization may impact school attendance, and thus language learning. Increased levels of self-deprecating thoughts can also impact students' self-esteem and thus language by way of a self-fulfilling prophecy.

A lack of research in this area makes it difficult to draw strong conclusions, or make assumptions about mediational processes impacting one language and not the other. An important consideration is the level and type of use of each language has across contexts. It is possible that over time English serves an important purpose academically and socially because children and youth are expected to display increased proficiency as they grow older. Spanish may serve a communicative purpose in limited contexts such as home and family, where a minimal level of proficiency may be enough to meet its function. The

contextual utility of language has been reported previously in the Latino literature. A study evaluating Latino adolescent's language use across contexts found that language moderated the effect of context on emotional outcomes (Perez, 2011). Specifically, Latino youth reporting a preference for Spanish language use reported better emotional experiences at home compared to school, as opposed to those whose language preference was English.

### **Limitations and Future Directions**

While this study makes an important contribution to the literature, several limitations should be noted along with appropriate future directions for improved research. First, this study only followed youth over a one-year period. Timing and spacing between measures may have had an impact in this study's ability to detect different results. Studies looking at longer or shorter periods of time may provide a better indication of how language and depression predict each other over time. Further, future research may benefit from assessing cohorts from preschool to high school. Second, differences in outcomes between cross-sectional and longitudinal data highlight the need for multi-method and longitudinal research. Given that Spanish was correlated with depressive symptoms at a cross-sectional level but English predicted changes at a longitudinal level, we should be attentive to the interplay between language and time when evaluating dual language youth. Additionally, future research should include mediational analyses that aid in understanding pathways between each language and depressive symptoms. Third, it was not possible to draw comparisons across language proficiency groups in this study's cross-lagged

panel models due to the small SPY sample size. Future research may address this issue by assessing a larger and more diverse sample that allows for the exploration of the models across proficiency groups. This could also be addressed by including students who are in educational environments where bilingual learning is expected or encouraged and formally taught. Fourth, this study evaluated students' cognitive academic language proficiency (CALP), an area of language highly impacted by schooling. Therefore, the level and quality of education of the students assessed had an impact on their scores. It is imperative to evaluate Latino youth with other educational experiences and in geographical areas with varying levels of educational quality. Fifth, although the WMLS-R was tested with a sample of bilingual participants, the measure was largely normed within a monolingual population. A lack of language tests that address the characteristics of bilingual populations has been pointed out in the literature and continues to be a need for research with dual language children and youth (Thordardottir, Rothenberg, Rivard, & Naves, 2006). Finally, future research may also explore interventions aimed at improving language skills along with depressive symptoms. Existing interventions targeting school engagement and tailoring services based on language among Latino youth and their families have shown efficacy in indirectly reducing internalizing symptoms (Gonzales et al., 2014).

### **Conclusions and Implications**

Extant literature suggests an association between language proficiency and depression in Latino youth. Nevertheless, only a handful of studies have explored

this association directly, and many less have used standardized language assessments. This study aimed to open the pathway for research in this area by employing a formal assessment of English and Spanish language proficiency within cross-sectional and longitudinal designs. Results suggest that both English and Spanish languages serve an important role in Latino youth mental health. Cross-sectional and longitudinal correlations revealed negative associations between Spanish language and depressive symptoms. At a longitudinal level, cross-lagged panel analyses indicated that the model with English language (Model 2) was a good fit for the data. This model suggests that in a one-year period, increases in English language proficiency are predictive of decreases in depressive symptoms. Likewise, increases in depressive symptoms are predictive of decreases in English language proficiency. Taken together, findings suggest that dual proficiency in English and Spanish, as opposed to just English dominance, is important in reducing risk for depression among Latino youth. Dual proficiency has been previously associated in the literature with positive academic (e.g., Lee & Hatteberg, 2015), and emotional and behavioral outcomes (e.g., Collins et al., 2011; Han, 2010), affording children and youth the ability to navigate contexts in each language and build stronger relationships both at home and at school (Han, 2010). On the other hand, youth with limited proficiency in both languages appear to be at a higher risk for depressive symptoms, and require special attention from researchers, mental health providers, educators, and policy makers alike. More needs to be known about the specific pathways connecting language proficiency and depression to allow for the design of appropriate

psychological interventions and sensible educational policies for students of diverse linguistic backgrounds.

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