Emergent Bilinguals with Specific Reading Comprehension Deficits: A Comparative and Longitudinal Analysis

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Abstract

This study centered on Dual Language Learners (DLLs) with specific reading comprehension deficits (S-RCD), that is, with poor reading comprehension despite solid word identification skills. The participants were 209 students in Grades 2-4, including both DLLs and English Monolinguals (EMs) with and without S-RCD. Mean comparisons indicated that DLLs and EMs with S-RCD showed weaknesses relative to typically developing (TD) readers in oral language, word identification, inference making, and reading engagement, but not in executive functioning. Longitudinal analyses indicated that across two academic years S-RCD persisted for 41% of DLLs and EMs alike. Altogether, the study extends research on DLLs with S-RCD by identifying variables beyond oral language that may account for their difficulties and providing insight into the extent to which their reading comprehension and word identification performance levels evolve during elementary school. Further, the findings point to the importance of early identification and intervention for weaknesses in reading comprehension and its component elements in both DLLs and EMS.

Dual Language Learners with Specific Reading Comprehension Deficits: A Comparative and Longitudinal Analysis

In the United States, Dual Language Learners (DLLs), or students learning English while continuing to develop their first or home language (Administration for Children and Families, 2013) comprise a demographically diverse population, varied in home language, geographic distribution, and socioeconomic resources (Hammer et al., 2011). Yet, 77.1% speak Spanish as their home language (National Center for Education Statistics, 2018). Many Spanish-speaking DLLs struggle with reading comprehension, a major life skill needed for academic and employment success (Mancilla-Martinez & Lesaux, 2010; Nakamoto et al., 2007).

Estimates indicate that approximately 10% of children have specific reading comprehension deficits (S-RCD), or poor reading comprehension despite relatively normal decoding skills (Nation & Snowling, 2000). The proportion of children with S-RCD may be larger among DLLs because DLLs tend to have marked oral language deficits in such areas as vocabulary and listening comprehension, weaknesses common among students with S-RCD (Spencer et al., 2014). However, a recent metanalysis found that oral language weaknesses do not fully account for reading comprehension problems in DLLs with S-RCD (Spencer & Wagner, 2017), possibly indicating that other variables may contribute to DLLs' S-RCD and serve as important areas for intervention or remediation in these students.

In this study we explore contributors to reading comprehension in DLLs and English Monolinguals (EMs) with S-RCD in comparison to their TD counterparts in order to determine if certain contributors to reading comprehension are idiosyncratic to DLLs with S-RCD. We examine formerly explored variables, such as oral language, as well as contributors to reading comprehension unexplored in DLLs with S-RCD, such as reading engagement and inference

making. Because poor reading comprehension persists considerably over time (Etmanskie et al., 2016), we also investigate whether S-RCD persists over a two-year period to a similar extent for DLLs and EMs or whether DLLs' deficits show a comparative decline over this time, suggesting they could be due to a developmental lag in English oral language skill (Lesaux et al., 2006). Longitudinal research on S-RCD in DLLs is particularly limited, but needed in order to better understand how and when to intervene to promote these students' reading comprehension development (Kieffer & Vukovic, 2013; Spencer & Wagner, 2017).

We examine contributors to S-RCD, framed by a componential view of reading (CVR; Aaron et al., 2008), which focuses on identifying subcomponents of reading within ecological, cognitive, and psychological domains that contribute to students' specific reading problems. In addition to the well-studied constructs of oral language and word reading, in the ecological domain we examine effects of demographic characteristics (e.g., good vs. poor readers, DLLs vs. EMs; Ahmed et al., 2016; Cain & Oakhill, 2009), in the cognitive domain we examine the impact of readers' linguistic and executive function skills, and in the psychological domain we examine reading engagement. We compare S-RCD and TD groups' performance on these variables, and whether language status – DLL or EM – interacts with reader group to affect performance. We also examine the developmental trajectories of students with S-RCD over two years to determine whether these students persist in S-RCD status, improve in reading comprehension, or develop new reading difficulties, such as problems with word reading.

Our study adds to the literature in the following ways. First, past studies have largely focused on DLLs with S-RCD in Grade 4 and beyond (Spencer & Wagner, 2017). These studies sampled from students with a mixture of first languages despite the prominence of Spanish-speaking DLLs in the United States, thus limiting our understanding of this group (Kieffer &

Vukovic, 2013; Lesaux et al., 2006). We attend to these limits by focusing on a group of students in Grades 2-4 with and without S-RCD, who are either native EMs or DLLs predominantly from Spanish-speaking families to identify contributors to S-RCD earlier in DLLs' development. Further, limited work has examined the persistence of S-RCD patterns over time. Thus, we examine development of students with S-RCD across two years to investigate potential heterogeneity of the S-RCD group's development, by examining how reading skill profiles vary over time. Further, because some reading disabilities emerge later in development, around Grade 4 (Etmanskie et al., 2016), we wanted to examine children younger than Grade 4 to determine whether there were changes in reading disability status across the transition from Grade 2-4. Such analysis will also provide insight into whether S-RCD in DLLs may be due to developmental lags – or deficits in – key contributors to reading comprehension. We organize our discussion of focal variables according to the theoretical domains of interest in the CVR.

Ecological Domain: S-RCD and Dual Language Learners

Though word reading, oral language, and general cognitive processes in S-RCD have been examined since the 1980s, few studies have focused on processes underlying S-RCD in DLLs. A recent meta-analysis identified only 16 such studies, among which English was the second language in all but one (Spencer & Wagner, 2017). This limited research is surprising, given the considerable evidence that DLLs, particularly Spanish-speaking DLLs, often fit the S-RCD profile: they tend to show average word reading skills, but starting in Grade 3 lag in reading comprehension in comparison to national norms (Mancilla- Martinez & Lesaux, 2010; Nakamoto et al., 2007) and EM peers (e.g., Farnia & Geva, 2013; Proctor et al., 2014). Further, these studies suggest DLLs' reading comprehension gap widens with age. Thus, comparing

DLLs with S-RCD to (a) students of the same language background without S-RCD and (b) EMs with S-RCD may yield critical insights into the bases of DLLs' S-RCD to reduce this gap.

Consistent with this notion, findings from Spencer and Wagner's (2017) meta-analysis on S-RCD in DLLs suggest two critical differences that deserve further study. First, DLLs with S-RCD, in comparison to DLLs without S-RCD, performed more poorly in reading comprehension (d = -2.47, based on 25 comparisons). Second, DLLs with S-RCD were lower in oral language skills than DLLs without S-RCD, but the difference in oral language skills (d = -.80, based on 46 comparisons) was not large enough to account for the disparity in reading comprehension between DLLs with and without S-RCD. Thus, we are in agreement with Spencer and Wagner's conclusion that differences in other, unexamined processes must contribute to DLLs' S-RCD.

Cognitive Domain: Linguistic and Higher-Order Cognitive Variables

Oral Language Predictors: Listening Comprehension and Vocabulary

Limited oral language knowledge and facility is established as a marker of S-RCD (e.g., Landi & Ryherd, 2017), though in the few studies including DLLs, it has been more commonly assessed with word- than sentence- or passage-level measures (Spencer & Wagner, 2017). Thus, we incorporated multiple oral language indicators to create a fuller profile of students with S-RCD. First, we assessed listening comprehension with a sentence-level measure known to be significantly harder for DLLs than EMs with S-RCD across Grades 1-4 (Kieffer & Vukovic, 2013). Second, vocabulary breadth, commonly assessed with tests that require matching of words to pictures, is a notable area of weakness in DLLs with S-RCD (Geva & Massey-Garrison, 2013; Kieffer & Vukovic, 2013; Lesaux & Kieffer, 2010; Li & Kirby, 2014). Third, vocabulary depth, which involves knowledge of multiple meanings of words (Zipke et al., 2009), is a particular weakness for Grade 7 DLLs (Logan & Kieffer, 2017), which aligns with Perfetti and

Hart's (2001) lexical quality hypothesis that the quality of representations of words, including depth of understanding, is a critical factor in reading comprehension. In the one known study to examine vocabulary depth in DLLs with S-RCD, Grade 8 DLLs with S-RCD had shallower vocabulary than those without S-RCD on one of two measures employed (Li & Kirby, 2014).

Word Identification

Average or above word identification skill is a defining feature of S-RCD; nevertheless, latent word decoding difficulty may contribute to S-RCD (Spencer & Wagner, 2017). In one study of DLLs from varied first language groups and EMs, Grade 4 typically developing (TD) comprehenders outperformed those with S-RCD on two word recognition measures, including the same measure employed in our study (WJ letter-word identification; Lesaux et al., 2006), though effect sizes indicated the differences were not statistically meaningful, and there were no main or interaction effects involving language group. DLLs may also be adequate decoders but not demonstrate fluent word reading rate in their second language (Ronberg & Petersen, 2016).

Inference making

Inference making involves integrating text-based information with other information from the text (local inferences) or outside the text (global inferences), with both inference types necessary for establishing coherent text representations (Graesser et al., 1994). Inference making appears to play a causal role in S-RCD (Cain & Oakhill, 2009), with research comparing EMs with and without S-RCD (matched in age, word reading accuracy, and vocabulary) finding weaknesses for those with S-RCD (e.g., Cain & Oakhill, 2006). Study of inference making in DLLs with S-RCD is far more limited, with the one known study on fifth graders showing TD readers outperformed those with S-RCD (Geva & Massey-Garrison, 2013).

Executive Functioning

EFs are domain-general skills necessary for guiding behavior towards a goal or coordinating complex task performance (Luria, 1966), such as reading comprehension. We adopt the unity-by-diversity (tripartite) view (Miyake et al., 2000) that EF consists of related but separable core components: inhibition, working memory, and cognitive flexibility (Diamond, 2013). The tripartite cognitive structure of EF typically does not emerge until mid to late adolescence (Lee et al., 2013; Xu et al., 2013), with a unitary structure typical of younger children up to 12 years of age (Wiebe et al., 2008; Xu et al., 2013). EFs contribute to reading comprehension beyond word reading and listening comprehension (e.g., Locascio et al., 2010: Sesma et al., 2009). Individuals with S-RCD have difficulties in the three core components of EF, with the research focusing mostly on general populations rather than DLLs and, of the three components, mostly on working memory (Carretti et al., 2009; Landi & Ryherd, 2017), which is critical for storing and integrating information during reading (Cain et al., 2004). Inhibition supports suppression of information irrelevant to comprehension (Barnes et al., 2004) and is significantly lower in individuals with S-RCD (Borella et al., 2010). Finally, cognitive flexibility enables readers to shift among text elements and reading processes, such as shifting from decoding to meaning-making, which those with S-RCD particularly struggle with (Cartwright et al., 2017; Conners, 2009).

Psychological Domain: Reading Engagement

Reading motivation facilitates reading engagement, which in turn may augment reading skills and knowledge that enable deeper, more accurate reading comprehension and thus reading achievement (Guthrie & Klauda, 2016). Reading motivation refers to the beliefs, values, and goals that energize and enable reading, while reading engagement encompasses students' behavioral, cognitive, and affective involvement in reading, as manifested through their effort,

social interactions, and expressions when reading. While reading engagement, measured with various assessments, predicts reading comprehension across Grades K-12 (e.g., De Naeghel et al., 2012; Taboada, et al., 2009), limited research has examined its role in reading comprehension for students with S-RCD, let alone DLLs with S-RCD. To our knowledge, two studies exist, both indicating lower reading engagement in students with S-RCD than in TD readers (Ronberg & Petersen, 2016; Cain & Oakhill, 2011).

Research Questions

Consideration of the extant research on DLLs with S-RCD led to the following questions:

1. Do students with S-RCD differ from TD readers in their levels of reading, language, EF skills, and reading engagement at a given time point? Further, are there any differences within the S-RCD and TD subgroups based on language status (EM, DLL)?
2. To what extent does S-RCD persist over a two-year period (Time 1 to Time 2)? Specifically, what profiles of reading comprehension and word identification performance are exhibited at Time 2 by students who met the criteria for S-RCD at Time 1, and are language status (DLL or EM) and grade level associated with the persistence of S-RCD at Time 2?

Method

Procedure

Data were collected in fall 2016 (Time 1) and spring 2018 (Time 2). Institutional Review Board approval, parental consent, and teacher consent were obtained, and research activities were carried out in accord with APA ethical guidelines. Research assistants administered all individual measures in one-on-one, 1-hour sessions at each time point. They also administered one measure (the Gates-MacGinitie Reading Comprehension Test) in large group settings, and

teachers completed one measure, the Reading Engagement Index (REI). DLLs had sufficient knowledge of English to understand all task instructions, which were in English.

Participants

Participants were drawn from Grades 2-4 in three suburban schools in a Mid-Atlantic state. Second graders were the youngest students included, as second grade is typically when involvement of oral language emerges as important for reading comprehension, versus first grade, when word identification plays a greater role (Kim et al., 2012). Participants were part of a broader project exploring cognitive and motivational predictors of reading comprehension. The current study is unique conceptually within the larger project, as it is the only study to focus on TD and DLL students with S-RCD (following work by Cutting and colleagues in EMs, e.g., Cutting et al., 2009). The study is also unique methodologically in that the current sample includes only one-fourth of the overall sample, with specific criteria used to delimit two groups that are not used in the larger study.

Following Cutting et al. (2009), students were designated as having S-RCD at Time 1 if they scored at or below the 25th percentile, based on national norms, on at least one of two reading comprehension measures AND at or above the 40th percentile for word identification. TD readers scored at or above the 40th percentile on both reading comprehension measures AND at or above the 40th percentile for word identification. These criteria resulted in 133 students in the S-RCD group and 76 students in the TD group.

Consistent with past work (e.g., Kieffer, 2014; Spencer & Wagner, 2017), language status was also used to group students. Students were designated DLLs if school records showed they had participated in English as a Second Language (ESOL) services and if they reported speaking a language other than English at home. Students were designated EMs if school records indicated

no participation in ESOL services and students reported English was the primary or sole language spoken at home. Table 1 summarizes language status and other sample demographics. Across groups, the majority of students were from low-SES homes, based on the receipt of Free and Reduced Meal Subsidies (FARMS; the only SES indicator available), and all students were largely from ethnic/racial minority backgrounds. Of the DLLs, 88% were Spanish-speakers.

Measures

Times 1 and 2

Reading Comprehension. The two reading comprehension measures were the passage comprehension subtests of the Woodcock Johnson-IV Tests of Achievement (WJ-IV; Schrank et al., 2014) and the Gates-MacGinitie Reading Tests (MacGinitie et al., 2000). The WJ-IV test includes 52 items of increasing difficulty including matching picture symbols with actual pictures, identifying pictures that correspond to 1-3 written words, and silently reading 1-2 sentences and providing missing words. Total correct scores were converted to *W* scores using the WJ online scoring program (Schrank & Dailey, 2014), which link scores across test forms (Form C was used at Time 1; Form B at Time 2). Cronbach's α was 0.88-0.90 at the two testing points.

The Gates-MacGinitie contains narrative and expository passages, each 3 to 15 sentences long, followed by three to six multiple choice items answered with the passage in view. Students completed the test level designated for their grade level, with Form S employed at Time 1 and Form T at Time 2. Extended scale scores were used in analyses. Cronbach's α ranges from 0.91-0.93 and alternate form reliability from 0.80-0.87 across levels (Maria & Hughes, 2008).

Word Identification. The Letter-Word Identification subtest of the WJ-IV (Schrank et al., 2014) includes a list of 78 letters and English words that students are asked to read aloud.

Total correct scores were converted to *W* scores (Mather & Wendling, 2014). Internal consistency (Cronbach's α) was 0.80-0.88 at the two testing points.

Time 1 Only

Listening Comprehension. The Oral Comprehension subtest of the WJ-IV (Schrank et al., 2014) includes 33 passages missing a final word that students must supply based on syntactic and semantic clues (e.g., "Water looks blue, and grass looks ___.") Total correct scores were converted to *W* scores (Mather & Wendling, 2014). Cronbach's α was 0.84.

Vocabulary Breadth. The Picture Vocabulary subtest of the WJ-IV (Schrank et al., 2014), comprised of 54 items, requires naming pictures using single words, with the task becoming increasingly difficult as less common objects are displayed. Total correct scores were converted to *W* scores (Mather & Wendling, 2014). Cronbach's α was 0.83.

Vocabulary Depth. For the Homonym Detection Task (Zipke et al., 2009) students must state as many meanings as they can for each of 10 words presented orally (e.g., *bank, can*). They are asked "Does it mean anything else?" if they state just one meaning. The number of unique, correct definitions given is the total score (Logan & Kieffer, 2017). Cronbach's alpha was 0.81.

Inference Making. The inference making task (Language and Reading Research Consortium and Muijselaar, 2018; Oakhill & Cain, 2012), assessed ability to make *local coherence inferences,* which integrate information from different story parts, and *global coherence inferences*, which incorporate students' background knowledge to fill in missing details and help formulate a globally coherent representation of the whole story. Students listened to two recorded stories of three paragraphs. Six questions requiring local coherence inferences and four requiring global coherence inferences followed each story. The score was the

total number of points earned, up to 40 (0, 1, or 2 points were possible per question, based on whether the answer was wrong, partially correct, or fully correct). Cronbach's α was 0.67.

Executive Functioning. EF was measured with three tasks: working memory, inhibition and cognitive flexibility. Following the unity-by-diversity framework (e.g., Miyake et al., 2000) these three components of EF were combined in a latent variable called EF skills (see Results). *Working memory* was assessed with the Letters Backward Subtest of the Test of Memory and Learning-2 (TOMAL-2), which includes 16 items that require immediately repeating backwards a list containing 2-9 letters. The total score is the number of letters recalled in correct order across all lists. Cronbach's alpha was 0.81. *Inhibition* was assessed with a NEPSY-II subtest (Korkman, Kirk, & Kemp, 2007) that requires naming a series of 40 objects (e.g., circles and squares) as quickly as possible, and then providing the opposite names for a series of the same objects (e.g., "square" for circle); two trials are given. Cronbach's α for our sample was 0.71. *Cognitive flexibility* was assessed with a card sorting task comprised of (a) two general trials, involving sorting two sets of 12 pictures of objects based on both color (e.g., red or yellow) and type (e.g., fruit or flower) into a 2 x 2 matrix (Cartwright et al., 2010) and (b) two reading-specific trials involving sorting two sets of 12 printed words by initial phoneme (e.g., /b/ or /t/), and word meaning (e.g., vehicle or animal). Cronbach's α was 0.67.

Reading Engagement. The Reading Engagement Index (REI; Guthrie et al., 2007) asks teachers to rate each of their students based on their overt manifestation of engaged reading as reflected in their behavior, cognitive involvement, and affect while reading. It includes eight items, answered on a scale ranging from *not true* (1) to *very true* (4); thus, total scores could vary from 8-32 points. The REI is scored by reverse coding one item (*is easily distracted in self-selected reading*), and then summing all item ratings. Cronbach's alpha was 0.88.

Results

Comparison of S-RCD and TD Readers

First, we examined whether S-RCD and TD groups differed in reading, language, EF skills, and reading engagement, and whether there were language status differences within the S-RCD and TD subgroups at Time 1. Multiple linear regression was used for analyses, except latent mean modeling was used for the latent EF variable. Descriptive statistics are in Table 2.

For the variables used in the eight regression analyses predicting Gates-MacGinitie reading comprehension, WJ-IV reading comprehension, word identification, listening comprehension, vocabulary breadth, vocabulary depth, inference making, and reading engagement, the missing rate ranged from 2- 4%. In the analyses, reader group (TD = 0, S-RCD = 1) and language status (EM = 0, DLL = 1) were included as predictors, with grade level as a covariate. The interaction between reader group and language status was also included. All results were evaluated using the Bonferroni-adjusted alpha value of 0.006 (0.05/8, since there were eight outcome variables). Full statistics are available in the Supplemental Results (Table S1), and summarized below.

Controlling for grade level, there was one significant interaction between reader group and language status, for vocabulary breadth, $\beta^* = -0.50$, $p < 0.001$. Specifically, the S-RCD/DLL group was lower in vocabulary breadth than the TD/EM group by 13.09 points, but did not significantly differ from the S-RCD/EM or TD/DLL subgroups. For all other variables – focusing on the models excluding the interaction terms, because they were not significant (Aiken & West, 1991) – there was a significant main effect for reader group favoring the TD group ($p <$ 0.001 for all). From largest to smallest magnitude, the standardized beta coefficients were -0.68 (WJ-IV reading comprehension), -0.62 (Gates-MacGinitie reading comprehension), -0.45

(reading engagement), -0.41 (listening comprehension), -0.40 (word identification), and -0.22 (vocabulary depth and inference making). There were also significant main effects for language status favoring EMs for three variables, all with $p < 0.001$: WJ-IV reading comprehension, listening comprehension, and vocabulary depth.

To examine differences among groups with regard to EF, structural equation models were used. However, prior to main analyses, following the unity-by-diversity view (Miyake et al., 2000), an EF skills latent variable was created based on performance on the inhibition, cognitive flexibility, and working memory tasks, in accord with Wiebe et al. (2008). The missing rate for each variable varied from 0.5% to 12%. Assuming missing at random, all models were fitted with full information likelihood estimation (FIML). There were seven continuous indicators for the variable: two for inhibition (scores on the two trials), four for cognitive flexibility (scores on the four trials), and one for working memory (the total score on the test). MPlus Version 8.1 (Muthén & Muthén, 2018) was used to fit and compare three measurement models. The best-supported model was a unidimensional CFA model with all indicators loaded on the EF factor, the four cognitive flexibility items fully correlated with each other, and the two inhibition items correlated with each other. Measurement invariance analyses indicated that all loadings were invariant for the TD and S-RCD groups (see Supplemental Results, Tables S2 and S3). These two latent factors were the ones used in subsequent analyses. To ascertain whether EF varied across groups, two latent mean models were fitted with language status and grade level as covariates. Model 1 constrained paths from language status to EF and grade to EF to be the same whereas Model 2 set the path from language status to EF free. The nested model comparison index, $\Delta\chi^2_{(1)} = 1.3$, $p = 0.25$, was non-significant indicating Model 1 fit significantly better than Model 2, and there was no interaction between language status and reader group. Model 1

indicated mean latent EF did not differ significantly for the TD and S-RCD groups, $\ell = 0.97$, s.e. = 0.52, $p = 0.06$, controlling for language status and grade level. Also, language status did not significantly affect EF, $\ell = -0.059$, s.e. = 0.19, $p = 0.75$ (see Supplemental Results, Table S4).

Reader Profiles at Time 2

Our second research question concerned S-RCD's persistence over a two-year period. We inquired whether reading comprehension and word identification changed over time for students with S-RCD at Time, and whether these changes were associated with language status (DLL or EM) and/or grade level (3-5) at Time 2. Of the 133 students with S-RCD at Time 1, 95 were available for analysis. These students did not differ significantly from the 38 attrited students in Time 1 word identification or reading comprehension performance.

Following our Time 1 classification criteria, we first assigned students to groups based on their reading comprehension and word identification performance at Time 2. Students were categorized as reading disabled (RD), lower achieving but not disabled (LA), or typically developing (TD) for each skill. Thus, there were nine possible groups (i.e., 3 reading comprehension categories x 3 word identification categories = 9 combinations). Specifically, for word identification at Time 2, students were identified based on their scores on the WJ Word Identification subtest as RD if they performed at or below the 25th percentile, TD if they performed at or above the 40th percentile, or LA if they performed at the 26th-39th percentile. For reading comprehension, in agreement with prior established criteria used at Time 1 (Cutting et al., 2009) students were identified as RD if they performed at or below the 25th percentile on at least *one* measure of reading comprehension (either the WJ passage comprehension or Gates-MacGinitie reading comprehension subtests), and as TD if they performed at or above the 40th percentile on *both* reading comprehension measures, consistent with the criteria used at Time 1.

The remainder, who either scored in the 26th-39th percentiles on both measures *or* in the 26th-39th on one measure *and* at the 40th or above on the other, were classified as LA.

To produce a more parsimonious schema, the nine groups were condensed into six profiles. As at Time 1, an S-RCD profile included those with RD comprehension but TD word identification. Students with RD comprehension and LA word identification were designated as Approaching S-RCD. Students with RD word identification and RD reading comprehension were designated Poor Readers. The other three profiles represented the students who improved in reading comprehension from Time 1 to Time 2. As at Time 1, a TD profile at Time 2 included students who were TD for both reading comprehension and word identification. An Approaching TD profile comprised the three groups of the original nine that were either LA in both reading comprehension and word identification *or* LA in one dimension but TD in the other. The last profile, Approaching S-Word Identification Deficit (S-WID), included students LA in reading comprehension and RD in word identification. No students showed TD comprehension alongside RD word identification, so the profiles do not incorporate this possible combination.

As shown in Table 3, at Time 2, 41% of the 95 students – in the overall sample as well as in each language subgroup – persisted in the S-RCD profile. The percentage of students with S-RCD was also similar across grade levels, ranging from 38-44%. Across the overall sample, an additional 20% continued to show RD comprehension, that is were either Approaching S-RCD (15%) or Poor Readers (5%). Similarly, across language status, an additional 18-23% continued to show RD comprehension, with 15% each of the DLLs and EMs with S-RCD at Time 1 Approaching S-RCD at Time 2, and 8% of DLLs and 3% of EMs fitting the Poor Readers profile. Across grade levels, the proportions of students Approaching S-RCD was similar, with a range from 13-19%, while the proportions of Poor Readers varied more, from 0-16%.

Of the 95 students initially with S-RCD, 38% fit one of the three profiles of improved reading comprehension. The largest proportion was Approaching TD, followed by TD, and then Approaching S-WID. This distribution pattern was consistent across language status and grades.

Discussion

This study was designed to compare the components and persistence of S-RCD in Spanish-speaking DLLs with and without S-RCD and their EM counterparts. Four major findings emerged from this study. First, the finding of weak oral language skills for Spanish-speaking DLLs with S-RCD corroborates prior findings (e.g., Spencer & Wagner, 2017). However, we found DLLs with S-RCD did not differ significantly from their EM peers with S-RCD. We extended this work by examining four reading comprehension predictors that had not been explored in Spanish-speaking DLLs with S-RCD; our second major finding indicated students with S-RCD were weaker than TD readers on three of these variables (word identification, inference making, and reading engagement) regardless of whether they were DLLs or EMs. Third, in view of the increasing importance of EF skills for reading achievement, for both EMs (Cutting et al., 2009; Follmer, 2018) and for DLLs (Kieffer et al., 2013; Taboada Barber et al., 2020), we compared EFs in students with S-RCD and TD readers. We found that EFs did not differ in magnitude nor in their contribution to reading comprehension across language groups or reader groups. Fourth, we found that 41% of the students in our sample initially determined to have S-RCD persisted in showing S-RCD after two years, whereas 38% of students initially with S-RCD showed improved reading comprehension. These patterns were consistent across language groups and grade levels. Altogether, the current analyses shed light on how the subcomponents of reading within ecological, cognitive, and psychological domains contribute to students' S-RCD (e.g., Aaron et al. 2008).

Components of S-RCD in DLLs and EMs

Oral language. Overall, consistent with past work (e.g., Landi & Ryherd, 2017; Spencer & Wagner, 2017), our regression analyses indicated that both DLLs and EMs with S-RCD experience difficulties with various aspects of oral language in comparison to TD readers. We included three indicators of oral language: listening comprehension, vocabulary breadth, and vocabulary depth. For listening comprehension and vocabulary depth, there were significant main effects for both reader group and language status, but no interaction between them, indicating the reader group effect held within each language group, and the language status effect held within reader group. The finding for vocabulary depth is particularly notable in indicating that weakness in this component of comprehension for DLLs with S-RCD appears at least as early as the elementary years and occurs in Spanish-English DLLs. The one previous study that examined this element in DLLs with S-RCD focused on Grade 8 Chinese-English DLLs (Li & Kirby, 2014). For vocabulary breadth, there was only a significant interaction effect; specifically, the S-RCD/DLL subgroup differed only from the TD/EM subgroup in this component.

Altogether, the findings add to prior evidence showing that oral language difficulties are disproportionately common among DLLs, and thus likely to *partially* explain DLLs' challenges with reading comprehension (e.g., Nakamoto et al., 2007; Kiefer & Vukovic 2013). However, we agree with others that these findings challenge the widely held assumption that DLL learners can merely catch up to their EM on- or above-grade peers in reading comprehension by merely being exposed to more English at school (e.g., Kieffer & Vukovic, 2013). Our finding that DLLs with S-RCD are weaker on oral language confirms that this is key for comprehension skill. Evidence, however, that DLLs' growth in oral language does not narrow the gap with their EM peers on reading comprehension (Kieffer et al., 2013; 2014) and the meta-analytic finding that DLLs with

S-RCD have reading comprehension weakness that is substantially greater than their oral language weakness (Spencer & Wagner, 2017) leave room for several other variables to explain the disparity in reading achievement between DLLs and EMs.

Word identification. Our regression analysis indicated that TD students were significantly stronger in word identification than those with S-RCD, with the effect moderate in magnitude, despite adequate word identification being a defining feature of S-RCD. Language status did not have a main or interaction effect, consistent with past research in which DLLs demonstrated early strengths in letter-word identification; however, in prior studies, DLLs fell below national norms starting in later grades (e.g., Grade 4; Kieffer & Vukovic, 2013). Thus, the current findings cannot be interpreted as evidence that instruction for DLLs with S-RCD should prioritize comprehension at the expense of attention to word identification.

Inference making. Our findings indicated that within both language groups, students with S-RCD were weaker in forming inferences compared to their TD peers. There were no differences in inference making based on language status. The fact that inference making differentiates between students with and without S-RCD is not surprising. Inference making has been causally linked to reading comprehension difficulties in English native speakers (e.g., Cain & Oakhill, 2006, 2009) and in DLLs with S-RCD (Geva & Massey-Garrison, 2013). Our measure of inference making was based on LARRC and Muijselaar (2018), which has been found to be a valid measure of discourse-level listening comprehension. It is intriguing, given that this task requires discourse level (oral) comprehension, that performance on it did not differ significantly for the two language groups. However, the fact that students with S-RCD were statistically lower on inference making indicates that, as noted in prior studies, the task demands skills that are directly involved in the act of reading comprehension, such as the ability to encode

details and maintain cohesion by integrating ideas presented in text and generating inferences using background knowledge (Cain & Oakhill, 1999). Students with S-RCD struggle with both of these skills, irrespective of language status. Given how little is known about inference making in DLLs, a consideration for future research is whether DLLs who struggle with inference making have difficulty retrieving relevant knowledge to make inferences (Cain et al., 2001), or, whether, perhaps, their challenges relate more to their developing language proficiency.

Reading engagement. Teachers rated TD readers higher in reading engagement than those with S-RCD, with the difference moderately sized and not affected by language status. This finding extends past work using students' reading frequency (Ronberg & Petersen, 2016; Cain & Oakhill, 2011) to represent reading engagement to teacher reports based on observing students during a prolonged time (at least 3 months into the school year). Our findings support engagement's relevance for predicting reading comprehension across language groups (De Naeghel et al., 2012; Taboada et al., 2009) and suggest more attention is needed to increase reading engagement in students with S-RCD. Such attention is warranted given engagement's established malleability in response to instructional practices among students of varied ethnic and language backgrounds (Taboada Barber et al., 2018; Wigfield et al., 2014).

Executive functioning. Our findings for EF were unique in indicating no statistically significant difference between reader groups or language groups. EF as a relative strength for DLLs aligns with findings suggesting a bilingual advantage for EF development (Calvo & Bialystok, 2014). We acknowledge that this interpretation is speculative as we have limited information about exposure and use of the first language (Spanish), and thus degree of bilingualism, for the DLLs in our sample. Given past findings of weaknesses in particular elements of EF for those with S-RCD compared to TD readers (e.g., Cartwright et al., 2017;

Cutting et al., 2009), it seems surprising that the S-RCD and TD groups were similar overall in EF performance. This finding is consistent, however, with that of Geva and Massey-Garrison (2013), who found no differences in working memory related to reader group or language status in Grade 5 students, including DLLs with several (non-Spanish) native languages. Given varying findings regarding EFs in students with S-RCD, and increasing evidence that EF is an important predictor of reading comprehension in broad samples of readers (Follmer, 2018), future work should examine connections among language status (e.g., whether students are balanced bilinguals or dominant in one language), EFs, and reading comprehension.

DLLs' and EMs' Profiles over Time

The current study also examined the persistence of S-RCD over two academic years. As a positive outcome, our analyses indicated that DLLs with S-RCD appear to be keeping pace with their EM counterparts in terms of the proportions showing improved reading comprehension at Time 2: 37% of DLLs and 42% of EMs performed above the 25th percentile at Time 2, effectively exiting RD status for reading comprehension. On the other hand, the majority of each language group (64% of DLLs and 59% of EMs) continued to show RD comprehension at Time 2, suggesting that many students in both groups had comprehension deficits rather than developmental lags. A small portion of both groups (3-8%) also developed difficulties with word recognition. Exactly the same proportions of each language background persisted at Time 2 in the S-RCD profile (41%) and showed the Approaching S-RCD profile (15%). This consistency of reader profiles across language groups is consistent with Lesaux et al.'s study of fourth graders (2006). By grade level, the proportions of students who persisted in S-RCD status were also similar, though with a trend toward persistence and grade level increasing together.

These findings extend past research demonstrating that DLLs identified with S-RCD at Grade 4 were weak in contributors to reading comprehension, namely vocabulary and oral comprehension, across Grades 1-4 (Kieffer & Vukovic, 2013) by showing that the S-RCD pattern itself, and, more generally, poor reading comprehension, may often persist in DLLs across at least two elementary grades. They also complement work showing the persistence of S-RCD across language groups in Grades 2 to 7 in a Canadian sample comprised of 80% native English speakers and 20% DLLs with varied first languages, but that did not look at persistence differentially by language group (Etmanksie, 2016). Etmanskie et al. similarly found that in Grade 7 65% of students identified with S-RCD in Grades 2 and 3 were below average comprehenders (they did not separate those who were below average into groups or examine word identification alongside reading comprehension at Grade 7 as in the current study). Altogether, these findings substantiate the importance of early identification and intervention for reading comprehension difficulties.

Study Limitations and Conclusions

In addition to research directions already suggested, future studies should assess the current findings' generalizability, especially with larger samples and other ecological variables such as different home languages and degree of bilingualism (e.g., emergent bilingualism versus balanced bilingualism). Other predictors of reading comprehension, particularly other indicators within the motivation domain, should also be a focus of future study. Further work is also needed to understand the role of EF in S-RCD across language groups.

Altogether, this study highlights the value in combining predictors of reading comprehension and longitudinal data to understand characteristics of students with S-RCD, especially those who are DLLs. Our findings indicate that challenges of students with S-RCD,

including Spanish-speaking DLLs and EMs, encompass difficulties with oral language (listening comprehension, vocabulary breadth, and vocabulary depth) as well as word identification, inference making, and reading engagement. Our findings also reveal the persistence of S-RCD across language groups, suggesting the importance of early intervention for all students with poor reading comprehension in the elementary years. Importantly, language status did not emerge as the sole determiner of the struggles experienced by students with S-RCD, and accordingly, instruction for these students should be differentiated on the basis of other, multiple variables.

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Table 1

Sample Demographics at Time 1

	Total (%)	S-RCD (%)			TD (%)		
	(n = 209)	Total (n = 133)	DLLs (n = 81)	EMs (n = 52)	Total (n =76)	DLLs (n = 23)	EMs (n = 53)
Grade							
Second	24.9	17.3	16.0	19.2	38.2	43.5	35.8
Third	43.5	48.1	51.9	42.3	35.5	34.8	35.8
Fourth	31.6	34.6	32.1	38.5	26.3	21.7	28.3
FARMS status							
FARMS	71.3	77.5	85.2	64.6	60.3	78.3	52.0
No FARMS	28.7	22.5	14.8	35.4	39.7	21.7	48.0
Gender							
Female	47.5	45.7	48.1	41.7	50.7	52.2	50.0
Male	52.5	54.3	51.9	58.3	49.3	47.8	50.0
Ethnicity/race							
Asian	3.5	3.1	3.7	2.1	4.1	13.0	0.0
Black	37.6	34.1	2.5	87.5	43.8	13.0	58.0
Hispanic	46.5	58.1	90.1	4.2	26.0	73.9	4.0
Native Hawaiian/ Pacific Islander	0.0	0.0	0.0	0.0	0.0	0.0	0.0
White	9.9	3.9	3.7	4.2	20.5	0.0	30.0
Multi-racial	2.5	0.8	0.0	2.1	5.5	0.0	8.0

Table 2

Means and Standard Deviations for Key Study Variables

		RC-GM	RC-WJ	WI	LC	VB	VD	IM	RE	EF
S-RCD	*M*	436.99	467.84	489.14	479.82	475.50	11.08	25.93	28.85	99.81
	SD	35.45	11.57	14.62	14.34	11.86	2.82	6.63	6.52	8.49
TD	*M*	480.61	488.41	498.55	492.27	484.99	12.66	29.61	34.75	101.45
	SD	36.93	10.18	15.67	9.86	11.58	3.59	5.87	4.68	7.47
DLL	*M*	446.09	469.20	490.78	479.25	472.81	10.64	26.03	30.71	99.98
	SD	34.34	13.81	14.79	14.15	11.50	2.77	6.41	5.94	7.67
EM	*M*	460.78	481.13	494.40	489.38	484.75	12.68	28.50	31.21	100.80
	SD	46.191	13.61	16.47	12.42	10.91	3.27	6.53	7.17	8.56
S-RCD/DLL	*M*	438.75	464.99	488.49	476.23	469.88	10.40	25.32	29.55	99.99
	SD	30.70	11.36	13.03	13.31	10.15	2.47	6.48	5.84	7.84
S-RCD/EM	*M*	435.82	472.36	490.17	485.43	483.96	12.16	26.88	27.64	99.54
	SD	40.78	10.59	16.98	14.34	8.97	3.01	6.86	7.38	9.47
TD/DLL	*M*	474.00	486.05	500.00	491.20	484.50	11.60	28.85	35.25	99.93
	SD	33.77	9.13	17.95	10.86	9.00	3.66	5.33	3.85	7.18
TD/EM	*M*	484.79	489.73	498.55	493.19	485.54	13.19	30.08	34.58	101.92
	SD	37.79	10.40	14.97	8.82	12.60	3.46	5.82	5.06	7.57
All	*M*	453.24	475.30	492.56	484.40	478.92	11.66	27.27	31.04	100.42
	SD	41.68	14.86	15.65	14.19	12.59	3.21	6.59	6.55	8.14

Note. S-RCD = reading comprehension deficit; TD = typically developing; DLL = Dual Language Learner; EM = English Monolingual; RC = reading comprehension; WI = word identification; LC = listening comprehension; VB = vocabulary breadth; VD = vocabulary depth; IM = inference making; RE = reading engagement.

Table 3

Reader profiles at Time 2 for students with Specific Reading Comprehension Deficit (S-RCD) at Time 1

		Students with disabled reading comprehension at Time 1 and Time 2				Students with improved reading comprehension from Time 1 to Time 2			
	Students with S-RCD initially	Total	S-RCD	Approaching S-RCD	Poor Readers	Total	TD	Approaching TD	Approaching S-WID
	Overall (*n*= 95)	61% (59)	41% (39)	15% (14)	5% (6)	38% (36)	13% (12)	20% (19)	5% (5)
Lang. status	DLL (*n* = 61)	64% (39)	41% (25)	15% (9)	8% (5)	37% (22)	10% (6)	20% (12)	7% (4)
	EM (*n* = 34)	59% (20)	41% (14)	15% (5)	3% (1)	42% (14)	18% (6)	21% (7)	3% (1)
Grade level (T1/T2)	2/3 (*n* =16)	63% (10)	38% (6)	19% (3)	6% (1)	38% (6)	13% (2)	19% (3)	6% (1)
	3/4 (*n* = 47)	55% (26)	40% (19)	15% (7)	0% (0)	45% (21)	15% (7)	26% (12)	4% (2)
	4/5 (*n* = 32)	73% (23)	44% (14)	13% (4)	16% (5)	28% (9)	9% (3)	13% (4)	6% (2)

Note. Percentages for each language status and grade level may not sum to 100 due to rounding. DLL = dual language learner. EM = English monolingual. S-RCD = specific reading comprehension deficit. TD = typically developing. S-WID = specific word identification deficit.