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RELATIONS BETWEEN READING MOTIVATION AND READING SKILLS IN
STUDENTS WITH A READING DISABILITY

by

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A Dissertation

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Abstract

The purpose of the present study was to examine the short-term longitudinal relations between two constructs of reading motivation (reading self-concept and value of reading) and two aspects of reading (reading fluency and reading comprehension) in a clinical sample of elementary school students diagnosed with a SLD in reading. Skills in reading fluency and comprehension were assessed by the Gray Oral Reading Tests, Fifth Edition (GORT-5; Wiederholt & Bryant, 2012) and reading motivation was assessed by the Motivation to Read Profile- Revised (MRP-R; Malloy, Marinak, Gambrell, & Mazzoni, 2013).

A cross-lag panel analysis was used to examine autoregressive paths (the relation between the same variables at two points of time) and cross lagged paths (reading motivation at time 1 and reading skill at time 2; reading skill at time 1 and reading motivation at time 2) in a reciprocal effects model. Support was found for the autoregressive paths, but not for the cross-lagged paths in the reciprocal effects model. A time-reversed model was also analyzed to rule out the possibility that results from the reciprocal effects model were due to regression to the mean. Limitations of the current study, implications for educational practice, and directions of future research were discussed.

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CHAPTER 1
RELATIONS BETWEEN READING MOTIVATION AND READING SKILLS IN
STUDENTS WITH A READING DISABILITY

INTRODUCTION

In the reading literature, researchers have examined a range of factors that contribute to the development of individual differences in reading, including motivation. A strong evidentiary basis suggests that reading motivation predicts reading achievement outcomes, such as better comprehension skills (Park, 2011; Taboada, Tonks, Wigfield, & Guthrie, 2009; Wang & Guthrie, 2004). However, the degree to which reading motivation predicts reading skills, such as reading fluency, in students of different levels of reading abilities is unclear. Given the importance of improving students' achievement in reading especially that of low skill readers, further investigation of the influence of reading motivation is warranted. The aim of the present study is to examine the possible reciprocal relations between two dimensions of reading motivation (reading self-concept and value of reading) and reading skills (fluency and comprehension) using a short-term longitudinal sample of students identified with a specific learning disability (SLD) in reading. The next section will define reading motivation and review the theoretical frameworks used to guide the present study. Subsequent sections will discuss the development of reading motivation and the literature on the relation between reading motivation and reading achievement.

Defining Reading Motivation and Theoretical Frameworks

Motivation is defined in a variety of ways. Broadly speaking, motivation has been defined as “the reasons underlying behavior” (Guay et al., 2010, p. 712) or as an attribute that influences an individual's behavior (Gredler, Broussard, & Garrison, 2004). Reading motivation

has been described as a complex interaction of different factors influenced by attributes of a student's task-related values and beliefs that are developed via previous experiences and learning (Guthrie & Wigfield, 2000; Conradi et al., 2014). The expectancy-value model (Eccles, 1983), states students' motivation to achieve reading tasks with intentional effort is related to their expectancy of being able to achieve the task and the value that success in the task would have for them. This model is one of four major frameworks of reading motivation that is referenced in the reading literature and enjoys the most empirical support (Conradi et al., 2014). It is important to highlight that the expectancy-value model emphasizes subjective perceptions and beliefs of an individual. In terms of reading, this means that if a student is able to read, and they believe that they can achieve it, they will be motivated to try. Readers who believe they are capable to achieve reading are likely to perform better than readers who believe they are not capable (Paris & Oka, 1986; Schunk, 1985). Students who value reading or perceive it as important will engage in reading more (Ames & Archer, 1988; Dweck & Elliott, 1983; Paris & Oka, 1986).

Research shows there are many factors of an individual's expectations of success and value in reading that influence their reading motivation. For instance, Knapp (2015) identified five dimensions of expectancies of success, including self-efficacy, view of ability, locus of control, support, and time. Factors that contributed to one's value of reading were intrinsic interest, utility value or extrinsic motivation, self-concept, relational value, and cost/risk. Knapp (2015) suggested that factors of expectancy and value interact to form reading motivation. However, variation exists across researchers regarding which factors best represent the reading motivation construct. For example, some researchers have examined reading motivation as a combination of intrinsic motivation and extrinsic motivation (Park, 2011), which may be viewed

as contributors to value in reading (Knapp, 2015). Intrinsic motivation comes from within an individual and involves the engagement in a reading activity based on traits, such as personal interest in the reading activity itself, preference for challenge, or perceived competence (Park, 2011; Baker & Wigfield, 1999). Extrinsic reading motivation refers to participation in a reading activity based on external values and demands, such as recognition, social interaction, grades, and required skills (Baker & Wigfield, 1999; Wigfield & Guthrie, 1997; Guthrie, Hoa, Wigfield, et al., 2007). When students are extrinsically motivated, their reading is not initiated by intrinsic factors, but rather by their desire to attain socially valued outcomes (Deci, Koestner, & Ryan, 1999). A more recent study viewed reading motivation as three dimensions, including reading self-concept, value of reading, and goals for reading (Quirk et al., 2009). Baker and Wigfield (1999) examined many factors that contributed to expectancies of success and value in reading, and additional factors of reading motivation, including self-efficacy, challenge, work avoidance, curiosity, involvement, importance, recognition grades, competition, social, and compliance.

Despite variation in literature, motivation theories, including the expectancy-value model, generally agree that reading self-concept and value in reading are two of the most influential factors of reading motivation that impact reading achievement (Ford, 1992; Knapp, 2015; Winne, 1985). Reading self-concept is a broad term encompassing self-perceived competence in the reading process (i.e., ability to decode new words or effectively use comprehension strategies), perceptions of reading skill and performance relative to peers (Gambrell, Palmer, Codling, & Mazzoni, 1996), and ideas about how and what to read (Conradi et al., 2014). Reading self-concept has been shown to have concurrent relations with students' current and future academic skills in reading. For instance, findings in studies conducted by Baker and Scher (2002) and

Gambrell et al. (1996) found that students with higher reading self-concept during their early reading experiences were linked with higher reading performance when compared to children of lower reading self-concept. Thus, students may require reading instruction and interventions that target reading skills and promote readers' self-concept (Quirk, Schwanenflugel, & Webb, 2009), especially in students with poor reading skills or specific learning disabilities in reading (Logan, Medford, & Hughes, 2011).

Value of reading is an important component of the expectancy value theory that contributes to reading motivation. Value of reading is defined as a person's relative attractiveness to participating in a reading task, and is related to a person's interest in and perceived importance or relevance of the reading task (Eccles, 1983). According to the expectancy-value model, a reciprocal relation exist between students' self-concepts in a specific domain, such as reading, and their value in that domain. Archambault, Eccles, and Vida (2010) described value of reading and reading self-concept as important parts of a holistic understanding of reading motivation, and suggest that the integration of both components are essential to understanding students' motivational experience in reading. The present study used the expectancy-value model of reading to conceptualize the relation between reading motivation and reading achievement in students with a SLD in reading. There are several motivation theories, but the expectancy-value theory is important for the current study because it helped guide the conceptualization of two influential drivers of reading motivation, including value in reading and reading self-concept which are examined in subsequent analyses.

A reciprocal effects model (Marsh, 1990) also offers a valuable framework that extends the expectancy value theory's conceptualization of the relations between reading motivation and

reading achievement (Quirk et al., 2009; Valentine, DuBois, & Cooper, 2004). The reciprocal effects model implies that reading motivation influences academic achievement and reading achievement affects reading motivation. In other words, reading motivation is influenced by prior reading achievement and reading motivation impacts subsequent reading achievement after controlling for previous academic achievement (Guay, Marsh, & Boivin, 2003). A growing body of research supports the reciprocal effects model as it relates to reading skill and reading motivation development. For example, Chapman, Tunmer, and Prochnow (2000) showed that young students' reading-related skills and performance at the start of formal schooling predicted higher levels of early reading self-concept, and that reading self-concept predicted subsequent reading performance. Quirk, Schwanenflugel, and Webb (2009) used structural equation modeling to show that reading self-concept significantly predicted reading fluency, and reading fluency predicted reading self-concept across the school year in a sample of second grade students. The reciprocal effects model (Marsh, 1990) is used in the present study to explain hypothesized reciprocal relations between reading self-concept, value of reading, and reading skills (fluency and comprehension) across a school year.

Development of Reading Motivation

Several key issues have been addressed in the motivation literature regarding how reading motivation develops. Earlier research indicated that students do not establish a foundation of competence or achievement-related self-perceptions and expectations for different academic activities until after the first few years of school (Gambrell et al. 1996). However, subsequent studies found that younger students' self-perceptions develop rapidly by their first and second years of school (Bates et al., 2016; Chapman, Tunmer, & Prochnow 2000). In fact,

younger students tend to have high competence and interests in different school activities (Wigfield et al. 2015).

Unfortunately, for many students this level of optimism and reading motivation may not be sustained across the first school year(s). For example, Chapman, Tunmer, and Prochnow (2000) found differences in students' level of reading self-concept between students making progress in reading and those who were not, after less than two months in kindergarten. Research indicates that changes occur in students' level of reading motivation as they progress throughout the elementary years, typically declining from kindergarten to fifth grade (Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002). This decline in reading motivation may be related to an increase in students' self-perceptions and awareness of their academic abilities over time (Wigfield et al. 2015). Information from report cards and general feedback about academic performance can lead to social comparison as students begin to recognize when their performance is less than that of their peers. This more realistic self-assessment may lead to lower levels of motivation, particularly in students who perform less well (Wigfield & Tonks, 2004).

Gender differences in the development of reading motivation have also been examined. Jacobs et al. (2002) found that girls and boys had similar competence beliefs in reading during their first two years of school, but that boys' competence beliefs and value of reading declined at a faster rate than did girls. In other studies, girls in the fifth and sixth grade reported significantly higher reading motivation compared to boys (Baker & Wigfield, 1999), and girls in the fourth-eighth and twelfth-grade outperformed boys in reading achievement (Klecker, 2006). These findings suggest that research may need to focus on boys' competence, self-beliefs, and value in reading in order to foster their reading achievement.

Relation between Reading Motivation and Reading Achievement

The literature provides ample support for the concurrent relation between reading motivation and reading skills (Morgan, 2007). Many cross-sectional studies suggest a positive relation between reading motivation and reading achievement (Baker and Wigfield, 1999; Bates et al., 2016; Gottfried, 1990; Park, 2011; Wang and Guthrie, 2004). For example, Gottfried (1990) conducted two studies, including one cross-sectional and one longitudinal study. In the cross-sectional study, Gottfried (1990) examined the relation between a total scale score of academic intrinsic motivation (enjoyment of learning, orientation toward mastery, curiosity, persistence, task endogeny, and learning difficult and novel tasks in various subjects) and reading achievement in a sample of 98 students in first through third grade. Reading achievement was measured by report card grades in reading, teacher ratings of reading skills (skills unspecified), and standardized measures of reading skills (skills unspecified). Results showed that academic intrinsic motivation was significantly related to students' report card grades in reading. Park (2011) examined the relations between reading self-concept, reading attitude, and reading comprehension in a sample of 5,190 fourth grade students. Factors of reading attitude were intrinsic and extrinsic motivation, and factors of self-concept were self-referenced perceived competence and peer-referenced perceived competence. Positive correlations were found between reading self-concept, reading attitude, and reading comprehension. However, extrinsic motivation was only positively correlated with reading comprehension when students had a moderate level of intrinsic motivation. Additional multilevel regressions revealed reciprocal relations between peer-referenced and self-referenced perceived competence.

Baker and Wigfield (1999) examined the separate influence of 11 components of reading motivation (self-efficacy, challenge, work avoidance, curiosity, involvement, importance, recognition grades, competition, social, and compliance) on reading achievement in a sample of 371 fifth and sixth grade students. Total scores combining vocabulary and reading comprehension from two norm-referenced tests were used. Results support the role that work avoidance, compliance, grades, and recognition play in achievement, although relations were somewhat inconsistent across the achievement measures. Wang and Guthrie (2004) used structural equation modeling to examine how latent variables of intrinsic (curiosity, involvement, preference for challenge) and extrinsic reading motivation (cognition, grades, social, competition, and compliance) predicted reading comprehension in a sample of 384 fourth grade students, including 187 U.S. students and 197 Chinese students. For the U.S. group, the structural modeling found direct paths between intrinsic reading motivation and reading comprehension after controlling for past reading achievement, extrinsic motivation, school reading amount, and enjoyment reading amount. In contrast, extrinsic reading motivation was negatively associated with reading comprehension after controlling for past reading achievement, intrinsic reading motivation, school reading amount, and enjoyment reading amount. These results could indicate that students who read for external reasons may not have the same level of desire to understand text as those who choose to read because they enjoy reading. Furthermore, these findings suggest that educators may want to give higher priority to promoting students' internal motivation than external motivation in the development of interventions.

Cross-sectional studies have provided evidence of concurrent relations between reading motivation and reading achievement at a single point in time. Although the literature on the

longitudinal prediction of reading achievement from reading motivation is scant, research has found a positive prediction of reading achievement from reading motivation across grades and time. For example, Taboada et al. (2009) conducted a short-term longitudinal study utilizing a sample of 205 fourth grade students to investigate the effects of intrinsic motivation (a total score that comprised of interest, involvement, self-efficacy, social collaboration, and perceived control in reading) on reading comprehension across a four-month period. Multiple regression analyses showed that intrinsic motivation significantly predicted reading comprehension even after controlling for previous comprehension levels. The second study conducted by Gottfried (1990) examined the longitudinal relations between reading skills (specific skills not specified) and academic intrinsic motivation across two academic years in a sample of 107 students between the ages of 7 and 9 (in grades first through fourth grade). Results showed that academic intrinsic motivation at age 7 predicted reading skills at age 9. Findings from these few longitudinal studies suggest reading motivation is a direct predictor of reading achievement over time. Quirk et al. (2009) expanded the literature by examining the bidirectional relation between reading motivation and reading fluency in a sample of 185 second grade students over the course of one school year. Results of this study revealed a reciprocal relation between reading self-concept and reading fluency across the year, supporting the reciprocal effects model.

In sum, cross-sectional studies provide ample evidence of a positive concurrent relation between reading motivation and reading achievement (Baker & Wigfield, 1999; Bates et al., 2016; Gottfried, 1990; Park, 2011; Wang & Guthrie, 2004). Longitudinal studies are rarely found in the literature, but those existing studies provide evidence for a predictive relation between reading achievement and reading motivation (Gottfried, 1990; Quirk et al., 2009; Taboada et al.,

2009). One important finding to highlight in the Quirk et al. (2009) study is the reciprocal relation between reading motivation and reading achievement. Additional studies are needed to investigate the reciprocal effects between reading motivation and reading achievement, especially with regard to struggling or low skill reader populations.

Reading Motivation in Low Skill Readers

Few studies have examined the role of reading motivation in students with lower skills or for those identified as having a reading disability, but results from this limited literature suggest that reading motivation may play a particularly important role for these students. For example, Melekoglu (2011) examined the separate influence of reading self-concept and value of reading on growth in reading comprehension over an 18-week period. The sample consisted of 13 struggling readers diagnosed with specific learning disabilities (the academic area was not specified) and 25 struggling readers without a specific learning disability ranging from grades 3 to 11. Students were identified as a struggling reader if their reading scores was at the “basic reading level” or below their current grade level. Findings showed that neither reading self-concept or value of reading predicted reading comprehension growth across an 18-week period in struggling readers with a SLD; however, reading self-concept contributed to comprehension growth in struggling readers without a SLD. It is noteworthy that methodical limitations including a small sample size collapsed across a wide grade range and a short time frame of data collection complicates the interpretation of these results.

A study by Logan et al. (2011) employed a larger sample of participants with varying skill levels in reading, and highlighted the importance of reading motivation for identified low skill readers in the study. The influence of intrinsic reading motivation (curiosity, involvement,

and challenge) on growth in comprehension across nine months of the school year was examined. Participants were 111 students in grades 4 through 6 identified as either good or poor readers based on their performance on a standardized assessment in reading (performance criterion was not specified). Previous reading comprehension skills significantly predicted current reading comprehension skills among good and poor readers. In addition, intrinsic reading motivation was found to predict growth in reading comprehension among poor readers across the school year; however, intrinsic reading motivation did not predict comprehension growth in good readers. Indeed, this finding supports the notion that the influence of reading motivation on reading achievement outcomes varies across reading skill levels, and that reading motivation may be more important in poor readers than typical readers in terms of predicting reading comprehension skills over time.

The term Matthew Effect (Stanovich, 1986) is often used in the literature to describe how low skilled readers who are less motivated to read, engage in less reading, and make slower progress in improving reading skills, compared to their higher skilled reading peers. Slow progress in reading typically causes these students to fall farther behind their peers, leading to an achievement gap that becomes more pronounced between the two groups across time (Stanovich, 1986). Quirk et al. (2009) reported evidence of this trend in a group of second grade students. In this study, findings revealed that lower levels of reading fluency skills at the beginning of a school year predicted lower levels of reading self-concept in the middle of the year, which predicted lower levels of growth in reading fluency skills at the end of the school year. Overall, it seems necessary that additional studies investigate the role that reading motivation plays in improving reading skills in students of low reading abilities. Findings will help guide the

development of effective interventions and prevent low skill readers from falling further behind their better reading peers.

The vast majority of research has examined the relation between reading motivation and reading comprehension, overlooking the vital skill of reading fluency. Reading fluency is the ability to read text with accuracy, automaticity, and appropriate expression (Kuhn, Schwanenflugel, & Meisinger, 2010). The pivotal role of reading fluency in facilitating reading comprehension has been well established (Fuchs, Fuchs, Hosp, & Jenkins, 2001), leading researchers to commonly describe reading fluency as the bridge between word reading and reading comprehension (Pikulski & Chard, 2005). Further, dysfluency is a common area of difficulty for students with reading disabilities and may impede comprehension of what is read (Lyon, Shaywitz, & Shaywitz, 2003; Meisinger, Bloom, & Hynd, 2010). In order to more fully understand the role of reading motivation in supporting reading skill development, it seems essential that future studies examine both reading fluency and reading comprehension, especially in students with a SLD in reading.

Current Study

Reading motivation plays a key role in reading skill development (Morgan & Fuchs, 2007). Increasing a student's reading motivation has the potential to improve their reading achievement across time, and may be of particular importance for struggling readers or those identified as having a specific learning disability in reading (Logan et al., 2011). Findings from empirical studies have shed light on the importance of interventions in both reading motivation and reading skills for our most vulnerable readers. The expectancy-value theory provides a theoretical framework to explain the relation between the two dimensions of reading motivation

(value of reading and reading self-concept) and reading variables. The vast majority of research has examined a unidirectional relation between reading motivation and reading skill development, despite emerging evidence indicating these relations may be reciprocal (Quirk et al., 2009). Only a handful of studies to date have investigated these relations longitudinally and with students who have a SLD in reading. Lastly, there is a dearth in the reading motivation literature with regard to reading fluency (Quirk et al., 2009). Considering the limitations of the current literature and the importance of improving reading outcomes for students with reading disabilities, the role that reading motivation plays in increasing reading fluency and reading comprehension across time warranted further examination.

The purpose of the present study was to examine the short-term longitudinal relations between two constructs of reading motivation, reading self-concept and value of reading, and two aspects of reading, reading fluency and reading comprehension, in a clinical sample of elementary school students diagnosed with a SLD in reading. A cross-lagged panel analysis with a time-reversed analysis was used to examine the reciprocal relations between the reading motivation and reading skill variables. A cross-lagged panel analysis allows for the examination of the direct and reciprocal relations among all variables over time. The time-reversed analysis was used to check for regression towards the mean in the original model (see Figures 1 & 2).

Four main research questions guided the present study: (1) What is the relation between two dimensions of reading motivation (reading self-concept and value of reading) and reading skills (fluency and comprehension)? (2) Does students' initial reading motivation predict their subsequent reading motivation at the end of the school year? (3) Does students' initial reading skills (fluency and comprehension) predict their subsequent reading skills at the end of the

school year? (4) Is there a reciprocal (cross-lagged) relation between reading motivation and reading skills across the school year? Based on the expectancy-value and reciprocal effects theories, it is hypothesized that initial scores for all variables will predict scores at the end of the school year and that cross-lagged effects will be observed across the reading and motivation variables.

CHAPTER 2

METHOD

Participants

Participants were a subgroup of students from a longitudinal study examining the development of reading fluency in students with a SLD in reading. Seventy-nine second through fifth grade students were enrolled full-time in a private school in the Southeastern United States that provides an intensive day-treatment program for students with reading disabilities (e.g., dyslexia). Prior to school admission, all students were identified with specific learning disorders with an impairment in reading using the diagnostic criteria outlined in the Diagnostic and Statistical Manual, Fifth Edition (DSM-5; American Psychiatric Association, 2013). Students were approximately 84.8% European American, 1.3% Asian American, 8.9% African American, and 5.1% other; 68.4% of the students were boys. Participants average age at time one was 110 months or 9 years, 2 months ($SD = 13.2$ months). Participants were 18 second graders, 24 third graders, 20 fourth graders, and 17 fifth graders. According to school records, the average full-scale IQ score for students was 103.39 ($SD = 14.1$). School records also revealed that many students had been diagnosed with one or more educationally relevant disorders, including attention-deficit/hyperactivity disorder (ADHD; 43.0%), SLD in written expression (30.4%), or SLD in mathematics (12.7%), and speech and/or language impairment (10.1 %).

First wave of data were collected in the fall and spring semesters of the 2015-2016 school year. The second wave of data were collected in the fall and spring semesters of the 2016-2017 school year. In instances where a student participated in both waves of data collection ($n = 15$), data from only one year were used to avoid duplication and to allow for a more even distribution

of students across grade levels. Students had attended the school for an average of 2.14 years ($SD = 1.34$).

Measures

Oral reading fluency and comprehension. Form A and form B of the Gray Oral Reading Tests, Fifth Edition (GORT-5; Wiederholt & Bryant, 2012) was used to assess proficiency in the oral reading of connected text and reading comprehension. Students were asked to read aloud from a student book that contained a series of increasingly difficult narrative passages. Examiners recorded reading time and word reading errors, including substitutions, self-corrections, additions, omissions, and reversals for each passage. Reading time (rate) and deviations from print (word-reading errors) scores across passages were summed to produce a Fluency scaled score ($M = 10$, $SD = 3$). Examiners removed the Student Book after reading each passage, and asked students open-ended comprehension questions about what was read. Correct comprehension responses were summed to produce a Comprehension scaled score ($M = 10$, $SD = 3$). For the Fluency and Comprehension subtests, the GORT-5 manual reports separate reliability and validity estimates, and average estimates for forms A and B (grades 1 to 5). For Fluency, the averaged test-retest reliability estimate for grades 1 to 2 was .87, and for grades 3 to 5 was .92. For Comprehension, the averaged test-retest reliability estimate for grades 1 to 2 was .83, and for grades 3 to 5 was .87. For Fluency, the averaged alternate form reliability estimate for grades 1 to 2 was .85, and for grades 3 to 5 was .93. For Comprehension, the averaged alternate form reliability estimate for grades 1 to 2 was .82, and for grades 3 to 5 was .76. Validity estimates with other tests of reading fluency and comprehension ranged from .68 to .77 (Wiederholt & Bryant, 2012).

Reading motivation. The Motivation to Read Profile- Revised (MRP-R; Malloy, Marinak, Gambrell, & Mazzoni, 2013) was used to assess participants' reading motivation. The MRP-R is comprised of two instruments, the Reading Survey and the Conversational Interview. The Reading Survey from the MRP-R is a scaled survey that assesses two dimensions of reading motivation, reading self-concept and value of reading, which is used in this study. The Conversational Interview was designed to accommodate the scaled survey as an option to further explore perceptions of reading via informal conversations with students. The interview was chosen to not be used in the current study. The MRP-R consists of twenty items representing the reading self-concept subscale (10 items) and value of reading subscale (10 items). Examiners read items and response options aloud, then asked students to mark responses that are best for them using a four-point scale. To measure reading self-concept, students were asked items that assessed their perception of reading skill level. For example, students were asked about whether they viewed themselves as a good reader and whether they felt able to figure out unknown words they might encounter when reading. To assess value of reading, items addressed the relative importance students place on reading, whether they enjoy reading (find it to be fun, boring, etc.), and if becoming a good reader is important. Item responses were either listed in order from most motivated (1-point response) to least motivated (4-point response) or from least motivated (1-point response) to most motivated (4-point response). Ten item responses that were in order from most-to-least were reverse-scored before items were summed to produce each subscale score.

The Motivation to Read Profile-Revised derived from the original Motivation to Read Profile (MRP; Gambrell et al., 1996), which is one of the most commonly used measures across studies in the literature (Conradi et al., 2014). During the original development of the MRP, 100

items were selected by researchers and sorted into three categories (reading self-concept, value for reading, or questionable) by three experienced teachers. To assess construct validity, items that received 100% trait agreement between teachers were selected as potential items, and factor analyses were conducted to determine select items used in the final field testing of the MRP Reading Survey instrument. Cronbach's alpha statistic for internal consistency revealed a reliability estimate for reading self-concept was $\alpha .75$ and for value for reading was $\alpha .82$ (Gambrell et al., 1996).

The Motivation to Read Profile- Revised was recently updated to reflect cultural and linguistic changes (digital reading) that have occurred since the original survey was developed (Malloy et al., 2013). On the MRP-R, seven items on the original Reading Survey were kept without changes on the revised version, and 12 items were either revised to address cultural and linguistic changes or to increase scale reliability. Factor analyses were not reported for the MRP-R. Reliability estimates of .85 for the value subscale, and .81 for the reading self-concept subscale using Cronbach's alpha were reported. The MRP-R provides a validity estimate of .089 using a root mean square error of approximation (RMSEA) when compared to the original MRP (Malloy et al., 2013).

Prior to addressing the research questions using the reading self-concept and value of reading dimensions, it seemed prudent to verify the reliability of the items representing the two dimensions of reading motivation at both time points (time 1 and time 2) using items analysis. Cronbach alpha coefficients were used to examine the internal consistency of the reading motivation dimensions. Within each dimension, the 10 individual items were examined to determine if they met criteria for acceptable alpha level ($\alpha > .70$). Items of the lowest alpha level

were considered for deletion in order to possibly improve total alpha coefficients. Results showed that all 10 individual items of each dimension met criteria for acceptable alpha level ($\alpha > .70$). In addition, the deletion of items with the lowest alpha level either reduced total alpha coefficients or did not significantly improve the total alpha coefficients. These results suggests that all 10 items should be retained in subsequent analyses. The two dimensions of reading motivation met criteria for acceptable alpha level across the both time points. For reading self-concept, similar coefficients were found for time 1 ($\alpha = .79$) and time 2 ($\alpha = .80$). For value of reading, coefficients were also comparable across time 1 ($\alpha = .85$) and time 2 ($\alpha = .88$). Results suggested good internal consistency, therefore, the two dimensions of reading motivation are of satisfactory to use in subsequent analyses.

Procedure

Data were collected in August (time 1) and May (time 2) of each of the two school years (2015-2016 & 2016-2017), following the approval from the University of Memphis Institutional Review Board. Written parental consent and student assent were required for participation in the study. Prior to collecting data, examiners listened to audio recordings and scored practice administered tests achieving a minimum of 95% agreement on practice test administration. Testing sessions were audio recorded by examiners to ensure accurate scoring. Twenty percent of the GORT-5 recordings were randomly selected for blind review by an independent reviewer. Discrepancies were rare (less than one percent) and were resolved via discussion. The MRP-R and GORT-5 scales were administered within a two-week period at both time 1 (August) and time 2 (May). The GORT-5 was individually administered and the MRP-R was group

administered by researchers in quiet locations at the school. Students received a small token of appreciation such as a sticker, silly band, or an eraser following each testing session.

Data Screening and Analytic Approach

Assumptions associated with path analysis, including model specification and model identification, were examined prior to conducting the analyses. All data were screened for outliers, missing data points, and normality. One univariate outlier ($z > 3.29$; Tabachnick & Fidell, 2012) was identified on the reading self-concept measure at time two. This outlier was converted to a value equal to the next highest score within three standard deviations of the mean. Mahalanobis Distance was utilized to screen for multivariate outliers (using $p < 0.001$ as the criterion), and none were found. Skewness and Kurtosis statistics for all variables were examined and were found within acceptable limits, respectively (Skewness < 3 , Kurtosis < 10 ; Tabachnick & Fidell, 2012). Visual examination of bivariate scatterplots indicated no multicollinearity. Approximately five percent ($n = 6$) of participants had missing data at either time one or time two. Results from Little's Missing Completely at Random test (Little, 1988) suggested that the missing values were missing completely at random ($p > .05$). The Maximum Likelihood Robust (MLR) method was used to estimate models and missing data values using Mplus 7.4 (Muthen & Muthen, 2014).

The examination of all hypothesized paths was possible within a reciprocal effects model and a time reverse model (see Figure 1 & 2). Models were tested using the following fit statistics: Chi-Square (X^2), Root-Mean Square Error of Approximation (RSMEA), Standardized Root Mean Square Residual (SRMR), Confirmatory Fit index (CFI), and Bayesian Information Criterion (BIC). The Chi-Square test statistic is a measure of “badness-of-fit”, with values of p

< .05 indicating that the model significantly differs from the observed data (Bollen, 1989). The RMSEA is a “badness-of-fit” index that estimates the error of approximation or lack of fit in a model compared to a population covariance matrix per degrees of freedom; values of .08 or less indicate a close fitting model (Hu & Bentler, 1999). The SRMR is an absolute measure of fit and is defined as the standardized difference between the observed correlation and the predicted correlation; values less than .08 is generally considered a good fit (Hu & Bentler, 1999). The CFI assesses the relative improvement in fit of a researcher’s model compared with a baseline model which assumes zero population covariances among the observed variables; values greater than .95 indicate a reasonably good fit of the researcher’s model (Hu & Bentler, 1999). Considering that the Chi Square and RMSEA can be overly sensitive to sample size (West, Taylor, & Wu, 2012), the CFI is included as a test of goodness-of-fit, as it is not sensitive to sample size (Hu & Bentler, 1999). The BIC allows for model selection among a set of models; whereby the model with the lowest BIC is the preferred model.

Correlational analyses were used to gain a preliminary look at the relations among the reading motivation (reading self-concept and value of reading) and reading skill variables (reading fluency and comprehension). Next, correlations were used to examine whether relations existed between the gender and grade differences across the variables of interest to determine potential covariates. A cross-lagged panel analysis was used to examine the reciprocal relations between variables across two time points (see Figure 1). Specifically, this initial model allowed for the examination of the autoregressive paths (the relation between the same variables at two points of time) and the cross lagged paths (reading motivation at time 1 and reading skill at time 2; reading skill at time 1 and reading motivation at time 2). Lastly, a time-reversed model served

as a comparison model (see Figure 2). The purpose of the time-reversed analysis was to rule out an important rival hypothesis, that the results in the original model were due to regression toward the mean (Campbell & Kenny, 2002). Regression toward the mean states that data with extreme values, whether they are higher or lower than the mean, will likely be closer to the mean if it is measured a second time, due to the error distribution. In the reciprocal effects model, variables at time two are treated as dependent variables and variables at time one are treated as independent variables. However, in the time-reversed model, variables at time two are treated as independent variables and variables at time one are treated as dependent variables. Reversing the temporal ordering in the original model and re-analyzing the data is expected to reverse the direction of the effect between variables (Campbell & Kenny, 2002).

There are two typical outcomes of a time-reversed analysis (Campbell & Kenny, 2002). The first possible outcome is that the original model and reversed model yield similar results, as indicated by no change in direction of the coefficients between variables in the time-reversed model. A possible explanation for no reverse in direction of the coefficients in the time-reversed model is that no change in variables occurred across time in the original model; therefore, the original and reversal analyses may yield the same result. Another explanation of the first outcome is that regression to the mean occurred; therefore, the results should be interpreted with caution. The next possible outcome of a time-reversed analysis is that the reversed model roughly reveals the same value, but opposite sign of original analysis. In this case, the regression toward the mean was not responsible for the observed relations and the time-reversed analysis provides additional support for the original model. This particular pattern of change was expected to occur in the current study. On the surface level, results from the time-reversed model

serves no real meaning by itself, but as a comparison model it bolsters our confidence in the accuracy of the original reciprocal effects model by ruling out an important rival hypothesis (regression to the mean).

CHAPTER 3

RESULTS

Correlational analyses revealed important findings. First, it was found that all variables significantly correlated with itself from time 1 to time 2 (ranging from .42 - .76, $p < .01$), indicating relative stability of the constructs across a full academic school year (see Table 1). Next, correlational analysis revealed significant relations between reading fluency and reading comprehension from time 1 to time 2 at the $p < .01$ level (ranging from .42 - .54). For the reading motivation variables, a significant correlation was found between value of reading at time 1 and reading self-concept at time 2. Correlations between the reading skill and reading motivation variables revealed significant relations between reading self-concept and reading fluency from time 1 to time 2. Value of reading was not significantly correlated with either of the two reading skills variables at time 2.

Results from these correlational analyses provided evidence of which variables at time 1 might be relevant for predicting variables at time 2 in the current study. Reading self-concept, reading fluency, and reading comprehension seemed to have reasonable potential to predict each other at a later time point. Therefore, these three variables were retained. However, the value of reading subscale was dropped from subsequent analyses due to the lack of significant correlations with any of the reading skill variables.

In the current study, it also seemed important to check for potential gender and grade-related effects on reading self-concept, value of reading, reading fluency, and reading comprehension. Results of point biserial and spearman correlational analyses showed that correlations between gender, grade, and variables of interest were either nonsignificant or weak

($r < .30$; see Table 1). Therefore, gender and grade were not added in the models as potential covariates.

Reciprocal Effects Model

The reciprocal effects model examined the possibility of a cross-lagged effect between students' reading self-concept, reading fluency, and reading comprehension skills (see Figure 3). An additional association between reading fluency and reading comprehension at time 2 was added to the model based on modification indices and because prior research and theory suggest that these two skills should correlate across both times points. All of the fit indices indicated a good fit of the model to the observed data, $\chi^2 (2) = 2.062$, $p > .05$; RMSEA = .020 (CI: 0.00-0.225); SRMR = .022; CFI = .999; and BIC = 2128.804. It should be noted that the confidence interval (CI) value is above what is considered acceptable, but it is not surprising given the small sample size of the current study. In this model, all autoregressive coefficients were significant ($p < .05$). Specifically, students' reading fluency, reading comprehension, and reading self-concept at time 1 predicted themselves at time 2. Contrary to our predictions, no significant cross-lagged parameter estimates were found between students' reading self-concept and reading skills. In sum, these results did not support the reciprocal effects theory as it pertains to reading motivation and skills in this sample. A summary of all the standardized and unstandardized parameter estimates and their standard errors for the reciprocal effects model can be found in Table 3.

Time-Reversed Model

Next, the time-reversed model was tested to examine the possibility of regression toward the mean in the original model (reciprocal effects model). Fit indices indicated a good fit of the

observed data and were equivalent to fit indices of the reciprocal effects model, $\chi^2 (2) = 2.486, p > .05$; RMSEA = .055 (CI: 0.000-0.237); SRMR = .023; CFI = .996; and BIC = 2129.721. The BIC difference between the two models (.917) indicated a small difference (less than two), which suggests similar fit. The confidence interval value in the time-reversed model is also above what is considered acceptable, which can be expected considering the current study's small sample size. To test for the possibility of regression to the mean, the paths within the time-reversed model were examined. Coefficients among all autoregressive paths were positive and significant. This result is similar to the positive and significant autoregressive paths found in the original model. For the cross-lagged paths, only the path from reading fluency at time 2 to reading comprehension at time 1 was positive and significant. All standardized and unstandardized parameter estimates and their standard errors for the time-reversed model are summarized in Table 3.

CHAPTER 4

DISCUSSION

Increasing students' reading motivation has the potential to impact their reading skills over time, especially for struggling readers or those identified as having a specific learning disability in reading (Logan et al., 2011). The primary aim of the present study was to address the dearth of research examining the possible reciprocal relations between reading motivation and reading skills in a longitudinal sample of students with a SLD in reading across one academic year. Results from this study did not support reciprocal relations among the reading motivation and reading skill variables. Further, results from the time-reversed model raised concerns regarding the potential influence of regression to the mean, suggesting caution in interpreting the results of the reciprocal effects model. Although this finding was unexpected, this study is one of a handful of longitudinal studies examining this topic, and placing these results in the context of the limited literature may shed light on important future directions of research.

The most prominent finding in this study pertained to the autoregressive path coefficients for reading self-concept and the reading skill variables. After taking into account initial reading skills, initial levels of reading self-concept were found to predict reading self-concept at the end of the school year. This finding is consistent with other studies that suggest that students' reading motivation is relatively consistent across an academic school year (Gottfried, 1990; Quirk et al., 2009). Results also revealed significant autoregressive paths between both reading variables at time 1 and reading variables at time 2 for students who participated in the current study. In other words, after taking into account initial reading motivation levels, initial reading fluency and reading comprehension skills predicted reading fluency and reading comprehension skills at the

end of the school year, respectively. These results also align with the broader literature showing that initial reading skill is a strong predictor for later reading performance (Stanovich, 1986).

The concurrent relations between reading self-concept and reading skills have been predominately examined using research designs that are cross-sectional in nature (Baker & Wigfield, 1999; Bates et al., 2016; Gottfried, 1990; Park, 2011; Wang and Guthrie, 2004). The significant and positive correlations among reading self-concept and the reading skills within each time point in this study were generally consistent with the broader cross-sectional literature. However, the lack of an association between the value of reading and reading skill variables resulted in the removal of value of reading from the models. The current study took the investigation a step further by examining the longitudinal relations among reading self-concept and reading skills. Surprisingly, results from this study did not support reciprocal relations between reading skill and reading motivation across the school year in this sample of students with reading disabilities. That is, after taking into account initial reading fluency and comprehension skills, students' initial levels of reading motivation had no significant influence on reading fluency or reading comprehension at the end of the year, and vice versa. This finding is inconsistent with results from prior longitudinal studies that have generally demonstrated predictive relations between reading motivation and reading skills in typically developing readers (Gottfried, 1990; Taboada et al., 2009; Quirk et al., 2009). However, these studies differed from the current investigation in potentially important ways. For example, in the longitudinal study by Gottfried (1990), the relations between reading motivation and reading skills were examined across a longer period of time (two years) in a larger normative sample of elementary school students. Taboada et al. (2009) examined reading motivation and reading

skills in a relatively short period (four months) in typical readers from a single grade at the primary school level, whereas the current study collapsed student data across grades (first-to-fifth grade) and examined skill development across an entire academic year. However, it should be noted that correlational analyses did not suggest grade level trends for the variables used in the present study. Variation also existed across the measures used to assess reading motivation, such that Taboada et al. (2009) utilized teacher ratings of intrinsic motivation, whereas similar to this study, Gottfried (1990) utilized self-report measures to assess academic intrinsic motivation. It is also important to note that intrinsic motivation (e.g., interest) is quite similar conceptually to value of reading (Eccles, 1985; Knapp, 2015), which was the variable dropped from our analyses.

Quirk et al. (2009) contributed to the limited longitudinal literature on this topic by providing support for the existence of reciprocal relations among reading motivation and reading skills. This study further expanded upon the literature by examining the reciprocal relations in a clinical sample of students with reading disabilities. Although the studies yielded disparate results, several similarities are worth noting. Quirk et al. (2009) and the current study both used versions of the motivation to read profile, assessed reading fluency albeit with different instruments, and spanned across an entire academic year. Further, the value of reading subscale was excluded from the final analyses in both studies. Quirk et al. (2009) eliminated the value of reading subscale due to extremely low inter-item correlations and poor reliabilities. Despite adequate reliability, value of reading was dropped from this study because of its lack of significant correlations with the reading skill variables. In contrast to the current study, Quirk et al. (2009) examined these relations utilizing a larger, normative sample of second grade students.

It seemed possible that typical readers and readers identified with a SLD could vary substantially in terms of their reading self-concept. Although the level of reading self-concept are roughly comparable based on mean values, it is likely that students with reading disabilities in the current study experienced greater difficulties in reading than participants drawn from normative samples (e.g., Gottfried, 1990; Taboada et al., 2009; Quirk et al., 2009). Differences in reading skill levels and/or reading disability status may explain why this study yielded disparate results. The limited literature on the role of reading motivation in students who are identified as either at-risk or with a SLD in reading may shed some light on this possibility.

Only two studies to date have examined the longitudinal relations between reading motivation and reading skills in students identified as having a SLD or as struggling readers without a SLD (Logan et al., 2011; Melekoglu, 2011). Findings from the Logan et al. (2011) study supported the notion that reading motivation may be of particular importance for students identified with lower reading skills, as intrinsic motivation was found to predict reading comprehension for poor but not good readers. However, it should be noted that the criterion for poor readers in the Logan et al. (2011) study was set rather high (standard score < 95). A standard score between 90 and 110 is average (Kranzler & Floyd, 2013), making it possible that some students in the poor reader group had likely fallen in this average range ($M = 88.10$, $SD = 6.09$). This suggests that the criterion for poor readers likely varies across multiple studies, and results pertaining to students' reading motivation and reading skills may vary as well.

Melekoglu (2011) examined the relation between reading motivation and reading comprehension in struggling readers with and without a SLD (the academic area was not specified). There were significant reading skill differences between struggling readers identified

with a SLD (53.8% below grade level) and those without a SLD (20.0% below grade level). Consistent with emerging patterns across the literature (Quirk et al., 2009; Gottfried, 1990; Taboada et al., 2009), initial reading self-concept was found to predict later reading motivation and reading comprehension in readers without a SLD (Melekoglu, 2011). However, consistent with results from the current study, reading self-concept and value of reading were not found to predict later reading motivation or reading comprehension in readers identified with a SLD (Melekoglu, 2011). Methodical limitations (i.e., small sample, short time frame for data collection) associated with the Melekoglu (2011) study suggest that caution is warranted in interpreting those results; however, this work expanded upon this nascent literature by using an more extended time frame and a larger clinical sample of participants with a SLD in reading. Together, findings from the current study and Melekoglu (2011) may suggest that students' low reading skills and/or SLD status may serve as a moderator for the relation between reading motivation and reading skills. On average, students in this study began the school year with reading fluency skills in approximately the 9th percentile. For our most struggling readers, being motivated to read may provide minimal facilitation of skill development. However, additional research is needed to elucidate the potential role of reading skill or SLD status in the relation between reading motivation and reading skill development.

Another goal of the current study was to use a time-reversed analysis to rule out an important rival hypothesis that the results of the reciprocal effects model were due to regression toward the mean (Campbell & Kenny, 2002). Model fit indices suggested that the reciprocal effects model was slightly better than the fit for the time-reversed model, but the fit of the time-reversed model was generally adequate. Therefore, paths within the time-reversed model were

further examined. It was expected that the positive coefficients in the reciprocal model would become negative when the model was temporally reversed. Unfortunately, results of the time-reversed model did not reject the competing hypothesis. That is, when the path coefficients that were found to be statistically significant across the two models were examined, the direction of the effects were not reversed. The positive autoregressive paths found in the reciprocal model were found to be positive and generally similar in terms of magnitude in the time-reversed model.

There are two possible explanations for this pattern of findings (Campbell & Kenny, 2002). The results may be caused by regression to the mean, which refers to the statistical phenomenon that data with extreme values tend to move closer to the mean when measured a second time. Therefore, these results could indicate that outcomes within the reciprocal effects model may be partly due to chance. This calls into question the validity of the original reciprocal effects model and suggests its results may not be replicated in future studies. Alternately, this pattern of result (no reverse in direction in the path coefficient for the time-reversed model) may also be caused by a lack of change in variables across time in the original model. The moderate correlation between the self-concept at time 1 and time 2 ($r = .46, p < .01$) pointed to at least some variation in scores across time, although differences at the mean level were rather small from time 1 ($M = 27.32; SD = 5.75$) to time 2 ($M = 28.96; SD = 4.89$). Whatever variation exists in students' reading self-concept across time, it does not seem to be contributing in a systematic way to their skills in reading fluency and reading comprehension in this study. There is no definitive explanation for the results of the time-reversed model, but no change across time in the reading self-concept variable in the reciprocal effects model appears to be a justifiable reason for

this outcome. Still, the potential threat of regression to the mean must be acknowledged as a risk to the validity of this study. Given the null findings associated with the most important aspect of the reciprocal effects model (i.e., the cross-lag paths), the time reversed model may not be that impactful in terms of interpreting the results. A replication study is needed to shed light on these results.

Implications

Understanding the contributions of reading motivation to reading skill is important, particularly for struggling readers. Findings of the current study may have important pedagogical implications. More specifically, the fact that students' initial levels of reading self-concept, reading fluency, and reading comprehension predicted themselves at the end of the year, points to the importance of teachers prioritizing the enhancement of reading self-concept and reading skills early in the school year. Taking time to promote reading motivation and reading skills early on could lead to higher levels of self-competence and success in improving reading skills down the road. Findings from this study and from Melekoglu (2011) may suggest that reading motivation is not be predictive of reading skills in SLD student populations. However, additional research is needed to elucidate the role of reading motivation within the instructional context, especially for students identified as having a reading disability. For example, researchers should consider including reading motivation variables as potential mediator for students' response to reading interventions. Results from a study conducted by Bates et al. (2016) showed that reading motivation mediated the effects of a reading intervention program on reading achievement for

struggling readers. This finding may suggest reading motivation is important for the reading intervention process, especially among low skilled readers. However, the results from the reciprocal effects model in the current study should be drawn with some caution given the patterns observed in the time-reversed model. To our knowledge this is only the second study to date to examine this topic longitudinally with students with a SLD, and additional work is needed to address this dearth in the literature. Findings from the current study contribute to the existing literature by shedding light on the rather limited role reading motivation plays in predicting reading fluency and reading comprehension in students identified as having a SLD in reading.

Limitations and Future Direction

Several limitations and future directions of the work of the current study warrant discussion. First, it is important to note that the current study collapsed student data across grade levels and used a relatively small sample size of participants. Future studies should use a larger sample of readers across these grade levels in order to rule out issues with statistical power and to possibly reveal subtler trends across development among the variables of interest. Participants in this study were predominantly Caucasian, English speaking students diagnosed with a SLD in reading. Whilst this was an exceptional group of students, it may be worthwhile for future studies to use a sample with ethnically and linguistically diverse student populations with a SLD in reading to enhance the generalizability of the results. Future studies may also examine disability status as a potential moderator in the relation between reading motivation and reading skill. The current study examined reading self-concept and value of reading, as an attempt to capture the reading motivation construct. However, future studies are encouraged to replicate the

current study with measures assessing different aspects of motivation. Lastly, the present study only used a self-report measure (MRP-R) to assess reading motivation, but future studies are encouraged to include multiple reporters of students' reading motivation such as teacher or parent questionnaires, in order to increase reliability of reporting. Future studies may want to use other report measures, such as teacher or parent questionnaires, in order to increase reliability of reporting.

Conclusion

In conclusion, this study yielded important information about the longitudinal relations between reading motivation and reading skills in students with a SLD in reading. However, additional research is needed to continue to investigate the role that reading motivation plays in improving reading skills of readers with a SLD in reading. Given the limitations associated with this study, replication efforts are essential to yielding data that may be used to inform reading instruction and improve outcomes for students with a SLD in reading.

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Table 1

Correlations, Means, and Standard Deviations of the Motivation and Reading Skill Variables

	RSC	VR1	RF1	RC1	RSC	VR	RF2	RC	Gende	Grad	<i>M</i>	<i>SD</i>
	1				2	2		2	r	e		
RSC1	1.00	--	--	--	--	--	--	--	--	--	27.3	5.7
											2	5
VR1	.34**	1.00	--	--	--	--	--	--	--	--	27.9	6.3
											9	0
RF1	.35**	.16	1.00	--	--	--	--	--	--	--	6.23	1.7
												8
RC1	.22*	.11	.	1.00	--	--	--	--	--	--	6.63	1.7
			65**									0
RSC2	.46**	.	.23*	.18	1.00	--	--	--	--	--	28.9	4.8
		32**									6	9
VR2	.21	.	.06	-.04	.48**	1.00	--	--	--	--	27.8	6.3
		56**									9	2
RF2	.31**	.17	.	.	.29*	-.01	1.00	--	--	--	7.21	1.7
			76**	54**								9
RC2	.15	.14	.	.	.18	.03	.	1.00	--	--	7.44	1.8
			42**	42**			57**					6
Gende	-.07	.01	-.27*	.22*	-.01	.00	-.17	-.11	1.00	--	1.32	.47
r												
Grade	.06	-.04	-.09	.07	-.07	-.11	-.13	-.03	-.07	1.00	3.46	1.0
												7

Note. RSC = reading self-concept, VR = value of reading, RF = reading fluency skill, RC = reading comprehension. The number following each abbreviated variable represents the time point of data collection.

* $p < .05$. ** $p < .01$.

Table 2

Fit Indices for the Reciprocal and Time-Reversed Models

	χ^2	df	p	CFI	RMSEA	SRMR	BIC
Reciprocal Effects Model	2.062	2	>.05	.999	.020 (0.00-0.225)	.022	2128.804
Time-Reversed Model	2.486	2	> .05	.996	.055 (0.00-0.237)	.023	2129.721

Note. χ^2 = chi square goodness of fit statistic; df = degrees of freedom; RMSEA = Root-Mean-Square Error of Approximation; CFI = Comparative Fit Index; Standardized Root Mean Square Residual = SRMR; BIC = Bayesian Information Criterion.

** $p < .01$

Table 3

Standardized and Unstandardized Parameter Estimates of the Structural Models

Reciprocal Effects Model			Time Reversed Model		
Paths	Parameter Estimate	S.E.	Paths	Parameter Estimate	S.E.
RSC 1 → RSC 2	.43** / .37**	.12 / .11	RSC 2 → RSC 1	.41** / .48**	.13 / .15
			1		
RSC 1 → RC 2	.01 / .00	.10 / .03	RSC 2 → RC 1	.03 / .01	.12 / .04
RSC 1 → RF 2	.06 / .02	.07 / .02	RSC 2 → RF 1	.02 / .01	.07 / .04
RC 1 → RC 2	.41** / .45**	.11 / .12	RC 2 → RC 1	.29** / .27**	.11 / .10
RC 1 → RF 2	.09 / .10	.09 / .09	RC 2 → RF 1	-.02 / -.02	.09 / .09
RC 1 → RSC 2	.07 / .21	.14 / .41	RC 2 → RSC 1	-.05 / -.14	.14 / .43
RF 1 → RF 2	.67** / .68**	.08 / .09	RF 2 → RF 1	.76** / .76**	.07 / .08
RF 1 → RC 2	.15 / .16	.13 / .13	RF 2 → RC 1	.36** / .35**	.11 / .11
RF 1 → RSC 2	.04 / .11	.13 / .34	RF 2 → RSC 1	.22 / .70	.13 / .41

Note. RSC = reading self-concept, RF = reading fluency, RC = reading comprehension. Each abbreviated variable is followed by a number signifying the time point for that variable. Standardized coefficients (left) and unstandardized coefficients (right).

* $p < .05$. ** $p < .01$

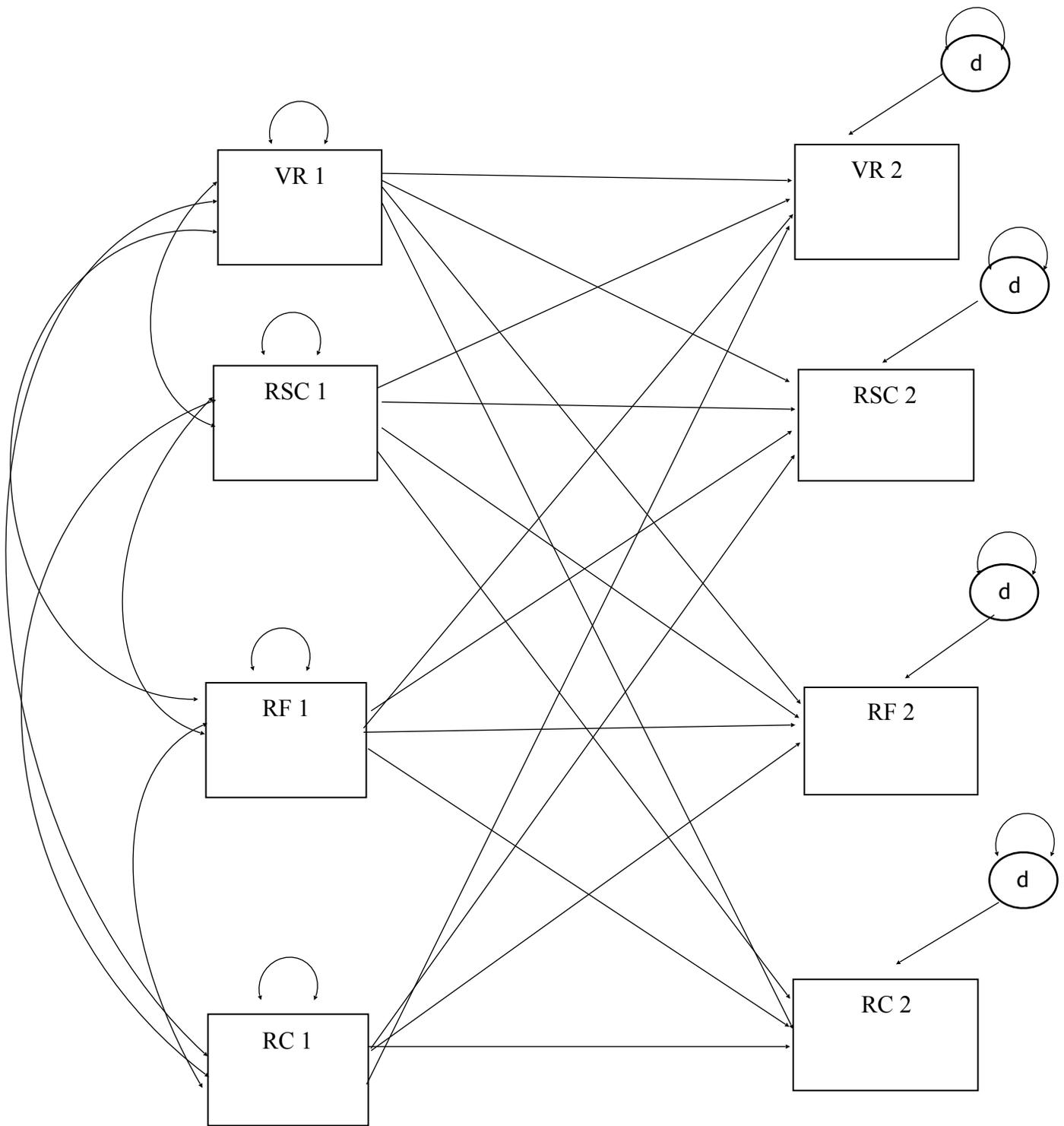


Figure 1. The Reciprocal Effects Model. Solid lines represent paths. VR = value of reading, RSC = reading self-concept, RF = reading fluency; RC = reading comprehension; numbers following variable names represent the time point of data collection.

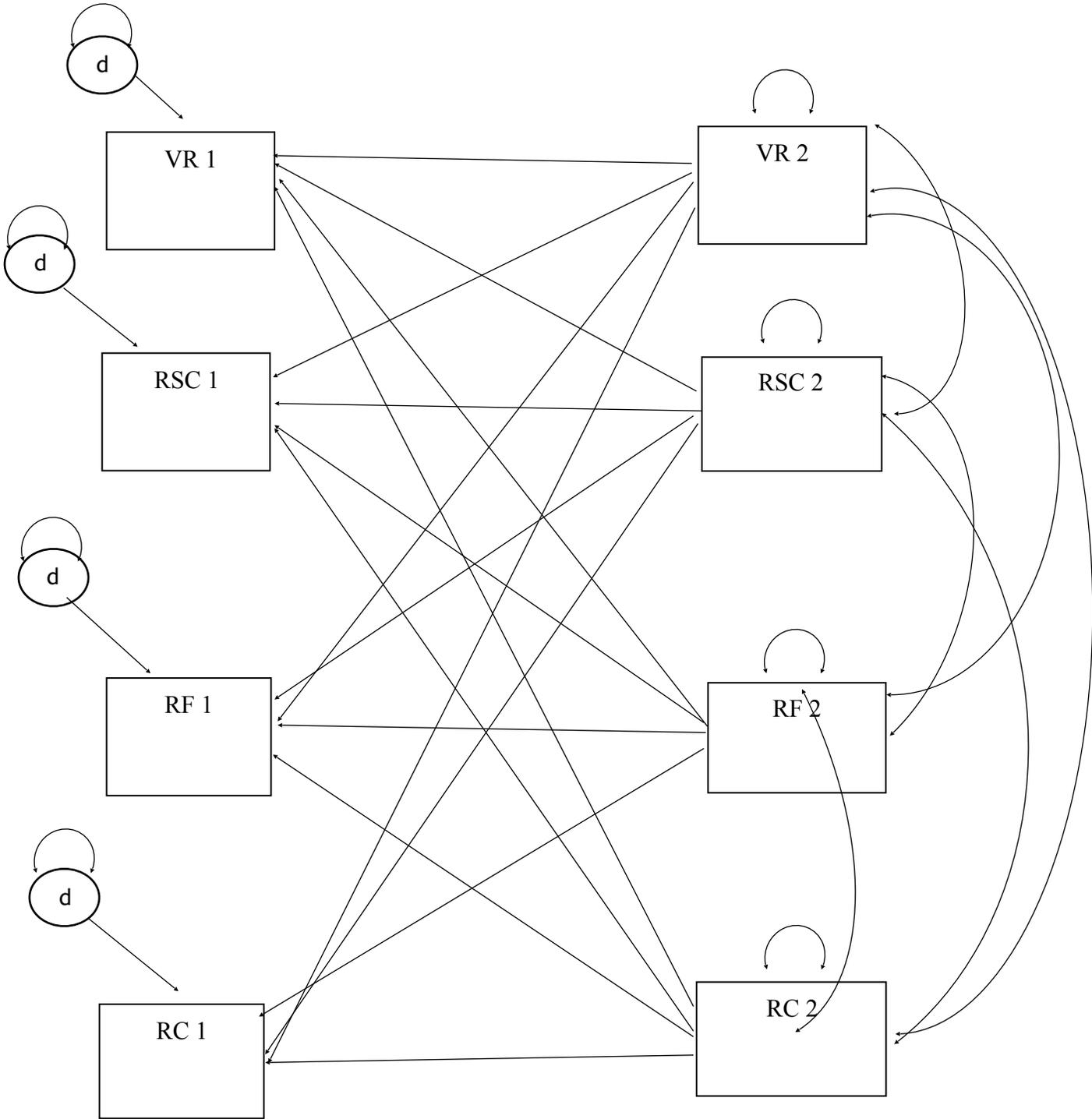


Figure 2. The Time-Reversed Model. Solid lines represent paths. VR = value of reading, RSC = reading self-concept, RF = reading fluency; RC = reading comprehension; numbers following variable names represent the time point of data collection.

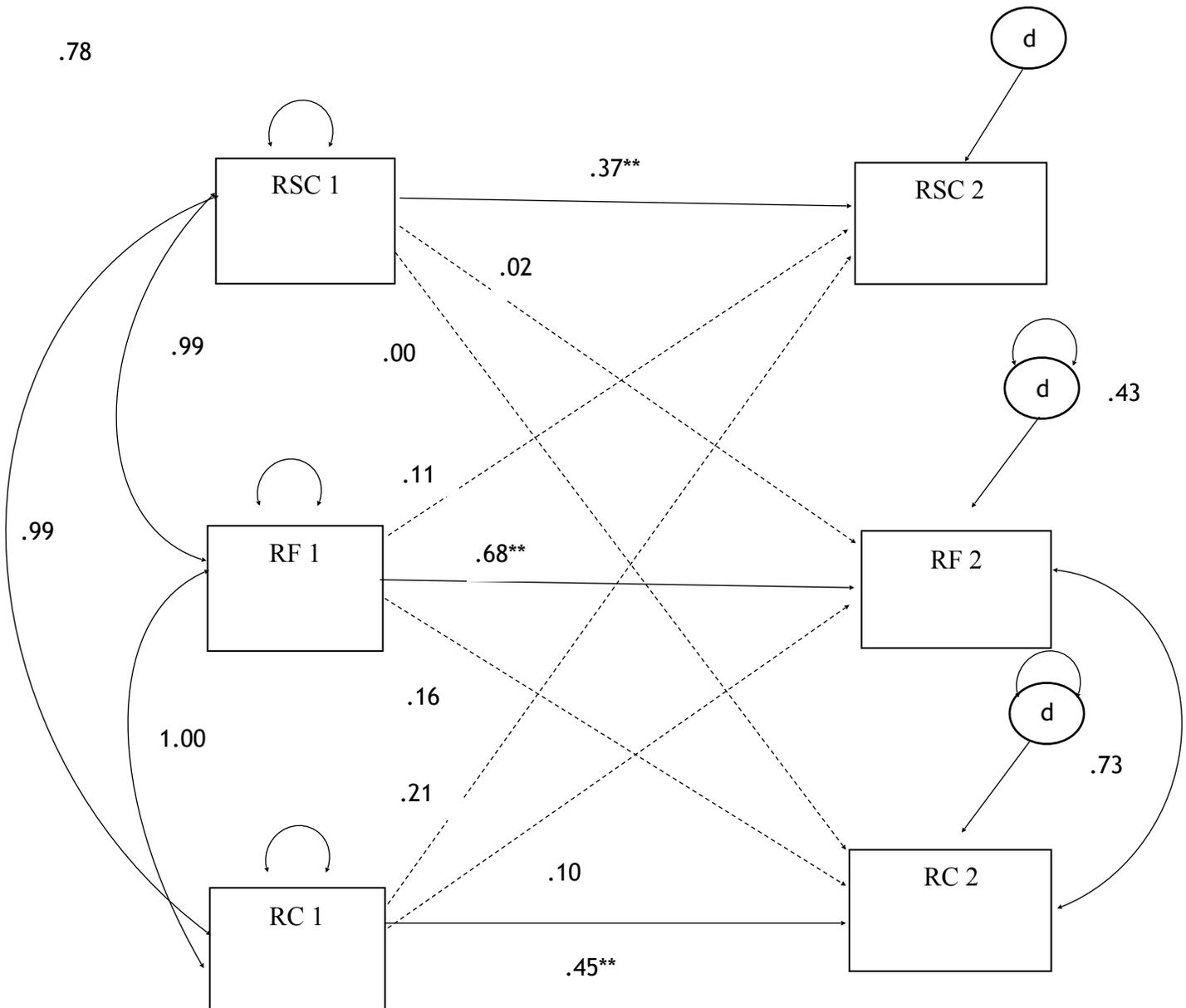


Figure 3. The Reciprocal Effects Model. Solid lines represent significant paths; dashed lines represent nonsignificant paths. RSC = reading self-concept, RF = reading fluency; RC = reading comprehension; numbers following variable names represent the time point of data collection.

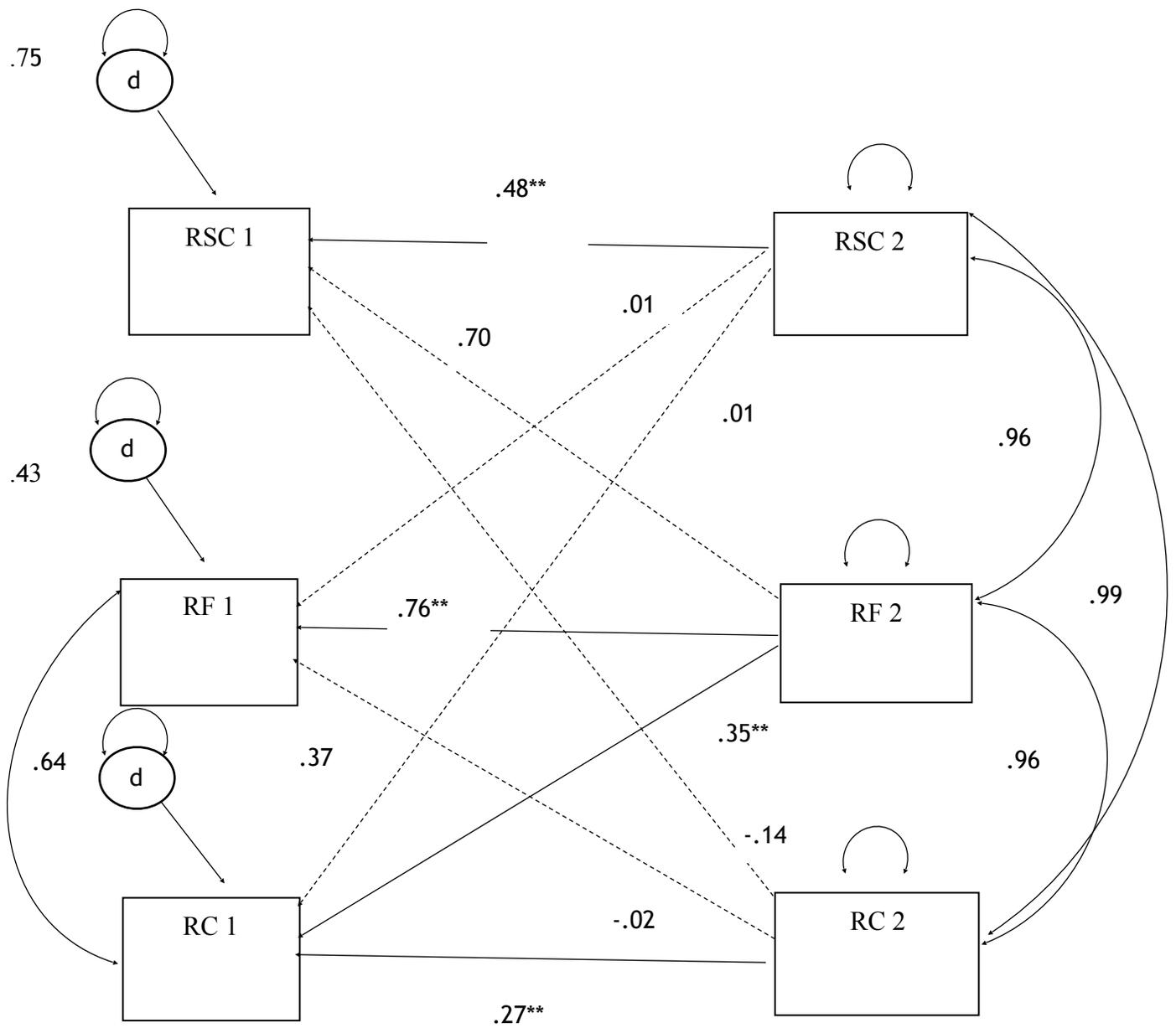


Figure 4. The Time-Reversed Model. Solid lines represent significant paths; dashed lines represent nonsignificant paths. RSC = reading self-concept, RF = reading fluency; RC = reading comprehension; numbers following variable names represent the time point of data collection.

APPENDICES

Appendix A:
IRB Approval Letter

Institutional Review Board
Office of Sponsored Programs
University of Memphis
315 Admin Bldg
Memphis, TN 38152-3370

PI: Elizabeth Meisinger
Co-Investigator:
Advisor and/or Co-PI: Jennifer Johnson
Department: Psychology
Study Title: The Growth of Reading Skills in Children with Dyslexia
IRB ID: 3814
Submission Type: Renewal
Level of Review: Expedited

IRB Meeting Date:
Decision: Approved
Approval Date: Jul 7, 2017
Expiration Date: Jul 7, 2018

Research Notes:
Findings:

The IRB has reviewed the renewal request.

Approval of this project is given with the following obligations:

- 1. If this IRB approval has an expiration date, an approved renewal must be in effect to continue the project prior to that date. If approval is not obtained, the human consent form(s) and recruiting material(s) are no longer valid and any research activities involving human subjects must stop.**
- 2. When the project is finished or terminated, a completion form must be completed and sent to the board.**
- 3. No change may be made in the approved protocol without prior board approval, whether the approved protocol was reviewed at the Exempt, Expedited or Full Board level.**
- 4. Exempt approval are considered to have no expiration date and no further review is necessary unless the protocol needs modification.**

Thank you,

James P. Whelan, Ph.D.
Institutional Review Board Chair
The University of Memphis.

Note: Review outcomes will be communicated to the email address on file. This email should be considered an official communication from the UM IRB.