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Master's Thesis of Education

The Mediating Effect of  
Perceived Difficulties in Attention on  
Relationship between Perceived  
Difficulties in Reading and Reading  
Achievement  
: Multi-Group Analyses by Grades and  
Achievement Levels

지각된 읽기의 어려움과 읽기성취의 관계에서  
지각된 주의집중의 어려움의 매개효과  
: 학년과 성취수준에 따른 다집단분석

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The Graduate School  
Seoul National University  
Major in Special Education  
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The Mediating Effect of  
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## Abstract

# The Mediating Effect of Perceived Difficulties in Attention on Relationship between Perceived Difficulties in Reading and Reading Achievement : Multi-Group Analyses by Grades and Achievement Levels

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## 1. Rationale

Although perceived difficulties in reading (PD-R) has been regarded as an important affective predictor of reading skills (e.g., Chapman & Tunmer, 2003; Kush, Watkins, & Brookhart, 2005; Rider & Colmar, 2005), it is difficult to be changed once formed. Morgan and

colleagues (2008) found that even six months into the first grade, students with poor emergent literacy skills already had weaker reader self-concepts than their peers. The difference in self-perception of this age then remained stable over a three-year period despite significant improvement in the decoding skills of the children with poor reader self-concepts. A study of first-graders in New Zealand also showed that students with poor emergent literacy skills reported more negative reader self-ability beliefs than their peers, even as early as six to eight weeks into the first grade (Chapman, Tunmer, & Prochnow, 2000). In addition, researchers found no evidence for considerable grade-level differences in the relationship between PD-R and RA between students in Grade 4, 7, and 10 (Shell et al., 1995). For students who have to learn new things through reading, these findings imply that educational support to improve PD-R may not reap benefits as expected.

However, not only PD-R but perceived difficulties in attention (PD-A) can predict students' RA (Loper, Hallahan, & Ianna, 1982). Based on the result of Chapman et al. (2000) that PD-R is also likely to be generalized into PD in any other academic and cognitive domains, it can be assumed that PD-A can mediate the effect of PD-R on RA. Considering aforementioned limitations, the current study aimed to examine the mediating effect of PD-A on the relationship between PD-R and RA.

After discovering the mediating effect, it is necessary to confirm whether those relationships are varied across students' grade. This is because the longitudinal relationship among PD-R, PD-A, and RA is rarely discovered, whereas the longitudinal relationship between PD-R and RA have been actively investigated. Furthermore, it is also important to examine whether these associations are different between

average and low achieving students. The main reason of investigating PD-RA relationship is to collect valuable information to plan educational support customized for low achieving students. In order to provide low achievers with adaptive reading intervention, it should be followed whether the structural relationship among PD-R, PD-A, and RA is different according to achievement levels of each student. Therefore, this study was initiated not only to demonstrate the mediating effect of PD-A on the relationship between PD-R and RA, but also to confirm whether this structural association is different across grades and achievement levels of elementary school students.

## 2. Methods

To solve the proposed research questions, data of 1,405 3rd-5th grade students from six elementary school students in K province, South Korea were collected in March through April of 2021. “Learning Disability Screening Test (LDST; Kim, 2012)” was used to measure students’ PD-R and PD-A. LDST is a self-report survey that students respond self-perceived academic difficulties. Researcher collected students’ responses of four items measuring PD-R and other four items measuring PD-A and utilized them into statistical analyses. In addition, “Basic Academic Skills Assessment: Vocabulary (BASA: V; Kim, 2019a)” and “Basic Academic Skills Assessment: Reading Comprehension (BASA: RC; Kim, 2019b)” were used as measures of children’s actual reading skills. Raw scores were all transformed into standardized scores and percentile based on the norm by grades. Children who were situated within 15th percentile from the bottom in both of RA assessments were designated as low achievers (Kim, 2000).

Statistical methods used in the present study were as follows. First, descriptive statistics and Pearson correlation analyses were conducted to explore the general tendency of study variables, using the SPSS statistical program. A normality assumption for structural equation modeling (SEM) was also verified by checking skewness and kurtosis of measured variables. Furthermore, one-way ANOVA was performed to confirm whether means of study variables were different across grades and achievement levels of participants. Second, confirmatory factor analysis (CFA), SEM analysis, and bootstrap method (N=5,000) were conducted to demonstrate the mediating effect of PD-A in the effect of PD-R on RA, utilizing the lavaan package of R statistical program. Third, two sets of multi-group analysis were performed to confirm whether the structural relationship among PD-R, PD-A, and RA is different according to children's grades and achievement levels. During all statistical analyses, children's sex and multicultural background were inserted into the research model as covariates so as to control the influences of these variables.

### 3. Results and Discussions

A summary of results and discussions derived from the current study was as follows. First, the results of CFA, SEM analysis, and bootstrap method showed that PD-A mediates the effect of PD-R on RA. That is, high PD-R can positively affect PD-A but negatively effect RA, and high PD-A can also leverage children's low RA. Educators thus accurately understand affective and perceptual bases of RA and try to provide students with reading intervention accompanied by efforts to enhance their positive self-perception in attention as well as in reading.

Second, this structural relationship was not different across students' grades. 3rd–5th grade students who were selected as participants of the present study had similar levels of influences among PD–R, PD–A, and RA. Since students in this stage are known to experience the transition from “learning to read” to “reading to learn” (Chapman & Tunmer, 1997), they might experience low RA if forming high PD. Hence, educators teaching 3rd–5th grade students should take a careful caution not to form high PD in reading and attention, and try to teach them strategies to monitor their current and improved attention state.

Lastly, the structural relationship among PD–R, PD–A, and RA also did not show any statistical difference between low and average achieving students. In other words, less skilled readers do not have extremely high or low PD compared to their actual RA, but rather form appropriate and realistic academic self-perception. Since PD–R and PD–A of low achievers are good predictors of actual RA as the same as those of average achievers, children's risk of fail in reading can be successfully predicted by simply measuring PD in classrooms. Therefore, teachers are necessary to regularly use measures such as LDST so as to identify students' difficulties in reading, and apply this information into selecting students who should be referred to supplementary interventions.

**keywords : Perceived difficulties in reading, Perceived difficulties in attention, Reading achievement, Mediating effect, Multi-group analysis**

***Student Number : 2019–20838***



# CONTENTS

<b>Chapter 1. INTRODUCTION .....</b>	<b>1</b>
1.1. Statement of Purpose .....	1
1.2. Research Questions .....	9
1.3. Definition of Terminologies .....	10
 <b>Chapter 2. LITERATURE REVIEW .....</b>	 <b>13</b>
2.1. Reading Development .....	13
2.1.1. Reading Developmental Model .....	13
2.1.2. Simple View of Reading .....	15
2.1.3. Complex Effect Model .....	18
2.2. Self-Perception .....	22
2.2.1. Definition of Self-Perception .....	22
2.2.2. Development of Self-Perception .....	23
2.2.3. Perceived Difficulties in Attention and Reading .....	26
2.2.4. Strategies to Monitor Attention .....	29
2.3. Perceived Difficulties and Reading Achievement .....	31
2.3.1. Two Models on PD-RA Relationship .....	31
2.3.2. PD-RA Relationship of Low Achievers .....	34
 <b>Chapter 3. METHODS .....</b>	 <b>37</b>
3.1. Sample .....	37
3.2. Measurement .....	38
3.2.1. Perceived Difficulties in Reading and Attention .....	38

3.2.2. Reading Achievement .....	39
3.2.3. Covariates .....	40
<b>3.3. Data Analysis .....</b>	<b>41</b>
3.3.1. Preliminary Analysis .....	41
3.3.2. Mediation Effect Analysis .....	41
3.3.3. Multi-Group Analysis .....	42
<b>3.4. Missing Data .....</b>	<b>44</b>
 <b>Chapter 4. RESULTS .....</b>	 <b>45</b>
4.1. Preliminary Analysis .....	45
4.2. Mediation Effect Analysis .....	49
4.2.1. Confirmatory Factor Analysis .....	49
4.2.2. Structural Equation Modeling Analysis .....	50
4.2.3. Bootstrap Method .....	53
4.3. Multi-Group Analysis .....	53
4.3.1. Multi-Group Analysis by Grades .....	53
4.3.2. Multi-Group Analysis by Achievement Levels .....	54
 <b>Chapter 5. DISCUSSION .....</b>	 <b>56</b>
5.1. Summary of Results .....	56
5.2. General Discussions .....	57
5.3. Limitations and Future Research .....	66
 <b>Bibliography .....</b>	 <b>68</b>
<b>Abstract in Korean .....</b>	<b>84</b>

## List of Tables

Table III-1 Dates of data collected .....	37
Table III-2 Items measuring perceived difficulties .....	39
Table IV-1 Descriptive statistics and correlations on major variables .....	45
Table IV-2 Correlation coefficients by grades and achievement levels .....	46
Table IV-3 Descriptive statistics and correlations on observed variables .....	47
Table IV-4 One-way ANOVA by grades and achievement levels .....	48
Table IV-5 Estimates of a CFA model .....	50
Table IV-6 Fit index of SEM models .....	52
Table IV-7 Path coefficients of the indirect mediation model .....	52
Table IV-8 A mediation effect analysis .....	53
Table IV-9 Factor invariance test .....	55

## List of Figures

Figure I -1 A research model .....	9
Figure II -1 Simple view of reading .....	15
Figure II -2 Four categories of reading disabilities .....	17
Figure II -3 Complex effects model .....	19
Figure II -4 A worksheet to monitor attention 1 .....	30
Figure II -5 A worksheet to monitor attention 2 .....	31
Figure IV -1 A direct mediation model .....	51
Figure IV -2 An indirect mediation model .....	51

# CHAPTER 1. INTRODUCTION

## 1.1. Statement of Purpose

According to Chall's (1996) reading developmental model, students after the fourth grade are marked by a pronounced shift from "learning to read" to "reading to learn." There is a corresponding shift in the classroom from an emphasis on narrative stories to expository passages, as the subject of reading becomes more integrated into content area of reading (Chall, 1996). Nowadays, as reading development accelerates, reading proficiency in the third grade is regarded as an important milestone indicating the completion of early childhood reading and the beginning of reading to learn new content knowledge (Beaudette, Chalasani, & Rauschenberg, 2017; Duke, 2019). Therefore, starting from the third grade, it is important for students to leverage reading comprehension skills as well as their vocabulary which is a basic component of text comprehension required to learn various concepts and knowledge from reading activities (Kim et al., 2018).

Although a multitude of components have been proven to impact children's reading comprehension skills, studies have consistently discovered significant relations with psychological factors, such as perceptions in one's performance, personal values attached to learning-related activities, and attitudes toward academic tasks (Chapman & Tunmer, 2003; Kush, Watkins, & Brookhart, 2005; Rider & Colmar, 2006). Children with effective reading skills tend to make positive psychological associations with the tasks by being dedicated

to reading more often, for longer periods of time, and with greater intensity (Henk & Melnick, 1995). In other words, higher reading achievement is predicted by more positive self-perception, whereas negative reading self-perceptions may induce frequent reading failures (Rider & Colmar, 2008). In order to enhance students' commitment to reading and reading achievement in the long term, it is highly necessary to understand the perceptual basis of one's reading development.

According to Chapman and Tunmer (1995), there are three different sub-components of reading self-perception: perceptions of competence in reading, perceptions of difficulty with reading, and attitudes towards reading. After Bandura emphasized the importance of self-efficacy, which represents the self-perception of competence, most studies on self-perception have focused on the effect of the efficacy belief on students' performances (Carroll & Fox, 2017; Peura et al., 2019; Schober et al., 2018; Schunk, 2003). Furthermore, as individuals' motivation influencing subsequent development of academic performance plays central role in research on self-perception, reading attitudes of school-aged children have been actively investigated as well (Kanuika, 2010; Katzir, Lesaux, & Kim, 2009; Malanchini et al., 2017). In contrast, there are only limited number of studies focusing on the perceived difficulties (PD) in children's reading. Although Katzir, Lesaux, and Kim (2009) stated that the perception of ease with reading was positively and most strongly correlated with reading comprehension than that of difficulty, other empirical studies suggested that higher PD may lead to a stronger path coefficient from self-perception to achievement in domains perceived more difficult than others (Schober et al., 2018; Valentine et al., 2004). Therefore, as PD surely contributes to

self-perception of abilities as a whole (Chapman & Tunmer, 1995; Deacon, Cook, & Parrila, 2012; Schober et al., 2018), beyond the theoretical discussion, it is necessary to clearly identify the empirical relationships between perceived difficulties with various academic abilities and actual reading performances.

Since the PD in reading (PD-R) is known to have great impacts on learner's selection of activity, goal setting, effort, persistence, and achievement (Forster & Souvignier, 2014; Schunk, 2003), numerous studies have investigated the correlation between PD-R and the actual reading performance over the last 30 years (Smith et al., 2012). Prior studies have clearly revealed that individuals with low PD-R are more likely to learn and achieve better in the future compared to others with identical levels of abilities but who have higher PD-R (Bandura, 1986; Pajares, 1996; Peura et al., 2019; Zimmerman, Bandura, & Martinez-Pons, 1992). If learners underestimate their own abilities, they set unnecessarily low goals for themselves and tend to give up easily even when facing small obstacles (Bandura, 1997). Learners who are overconfident in their own abilities are more desirable in that they are able to take advantage of their high level of confidence by developing new skills and abilities (Assor & Connell, 1992). Based on the prior research, it is now agreed upon that ideal learners should compensate their own weaknesses through having accurate self-perception on what they can do and cannot do (Forsterling & Morgenstern, 2002), moreover the educational intervention is highly recommended for learners to develop healthy and positive self-perception on their reading performance.

Unfortunately, children in the fourth stage of Chall's (1996) reading developmental model typically form PD-R that is difficult to change. According to Marsh, Craven, and Debus (1991), changes in

PD-R are known to be rather small and stable over time once developed. Researchers found no evidence for considerable grade-level differences in the relationship between PD-R and RA between students in Grade 4, 7, and 10 (Shell et al., 1995). This result was corroborated by Carroll and Fox (2017) and Katzir, Lesaux, and Kim (2009), stating that PD-R becomes static after the fourth grade. Some studies emphasized that PD-R is fixed at even earlier ages. For example, Morgan and colleagues (2008) found that even six months into the first grade, students with poor emergent literacy skills already had a weaker reading self-concept than their peers. The difference in self-perception of this age then remained stable over a three-year period despite significant improvement in the decoding skills of the children with poor reading self-concepts. A study of first-graders in New Zealand also demonstrated that students with poor emergent literacy skills reported more negative reader self-ability beliefs than their peers, even as early as six to eight weeks into the first grade (Chapman, Tunmer, & Prochnow 2000). For students who have to learn new things through reading, these findings consistently imply that educational support to lower PD-R may not reap benefits as expected.

However, it is important to note that reading achievement is not only correlated with PD-R, but also PD in other cognitive or academic abilities such as attention. Attention is a psychological energy aimed to select information for further processing while inhibiting other information from being processed (Pashler, 1988). As decoding and understanding written texts require sustained attention, there have been a plethora of empirical studies showing that attention predicts RA of students (Bosse & Valdois, 2009; Flory et al., 2006; Smallwood, McSpadden, & Schooler, 2008). In the current study, we



focused on how the perception in one's own attention abilities can be useful to predict the reading outcomes of learners at school. The awareness or perceived difficulties in one's own attention can be conceptualized as a "self-perception in attention (PD-A)" or "meta-attention." Although the term meta-attention, according to Wu (2017), encompasses both knowledge of attention (e.g., learners' self-perceived attention state and awareness of distractors in the surroundings) and regulation of attention (e.g., the regulatory strategies learners use to help them stay focused), PD-A only indicates the perception of one's own attention state. Compared to attention or self-perception in general, PD-A, which is regarded both as metacognitive and affective process (Efklides, 2006), is less researched area (Reisberg & McLean, 1985). Nevertheless, through a few empirical studies, it was demonstrated that PD-A is able to predict students' academic achievement and learning-related outcomes. For instance, Loper and Hallahan (1982) detected a statistically significant relationship between PD-A and achievement, and Loper, Hallahan, and Ianna (1982) also found that negative PD-A of students with learning disabilities led to low academic performances. Wu (2017) revealed from the multilevel structural equation model that media multi-tasking self-efficacy can impact learning performance via students' perceived attention problems.

Furthermore, there have been some pieces of evidence that PD-A covariates with PD-R (Webster et al., 2021). Chapman et al. (2000) discovered that PD-R, which is a core component forming one's academic self-perception, can significantly impact individuals' self-perception in other cognitive and academic abilities. Thus, it is logical to postulate the significant effect of PD-R on PD-A. This hypothesis can be further corroborated by the age PD-A and PD-R

are sophisticatedly formed. PD-R may start to be formulated six months into the first grade (Morgan et al., 2008) and significantly associated with reading by the fourth grade (Carroll & Fox, 2017), while PD-A can still be changed after the fifth grade (Loper & Hallahan, 1982). Therefore, it is highly likely that PD-R influences the formation of the malleable PD-A, not in vice versa. Based on this argument, we investigated the mediating effect of PD-A on the associational path from PD-R to RA. If the mediating effect is discovered, we can assume that explicitly learning strategies to monitor one's own attention may also leverage positive outcomes in reading achievement (Kirby 1988), instead of directly improving PD-R which is more static than PD-A.

Upon investigating the associational relationship among PD-R, PD-A, and RA, it is necessary to identify whether this relationship is stable across students' grades in the long term. Considering that comprehension skills are important for reading performance of students over third grade, some studies have revealed the relationship of PD-R with reading comprehension. For example, by grade 4, self-perception and reading comprehension skills are positively correlated after controlling students' verbal and word reading skills (Katzir, Lesaux, & Kim, 2009). Others have found a positive association between self-perception and both reading fluency and comprehension among students in Grade 5 and 7 (Ho & Guthrie, 2013; Mercer et al., 2011). Although the longitudinal relationship between PD-R and RA has been established, the relationship between PD-R and PD-A as well as the association between PD-A and RA has not been clearly investigated. Thus, we additionally conducted a multi-group analysis by grades, based on the proposed mediation model.

The identical relationship among PD-R, PD-A, and RA still needs to be explored in terms of students' level of achievement, in order to provide customized interventions for the low achievers who need more urgent educational support. As the associations between predictors and academic achievements may depend on the level of the achievement itself (Petscher & Logan, 2014), some studies discovered that PD-RA relationship of low achievers is known to be weaker than that of average achievers (Heath & Brown, 1999). One of the convincing hypotheses that explain this relatively low PD-RA correlation of low achieving students is the "self-protection hypothesis" (Heath & Glen, 2005). The self-protection hypothesis describes that low achievers tend to distort their own PD in order to protect themselves from negative emotional outcomes derived from academic failures. To be more specific, students struggling with reading are more likely to exaggerate their own ability to a larger extent than average readers (Dunning et al. 2004).

This tendency may put low achieving readers particularly in danger of the vicious cycle (Kwon & Linderholm, 2014), since overestimating the perception of one's reading level contributes to sustaining a level of capability by overestimating one's reading performance with specific texts as well (Linderholm et al. 2008). In other words, overconfident students compared to their actual performance will slack off in their efforts, which can retard future learning. Although there are some contrasting facts that students who had extremely positive self-perception were more likely to work harder, persevere and seek support to finish a task (Linnenbrink & Pintrich, 2003), it is more widely supported that positive self-perception, without the required knowledge and skills, will not result in improved RA in the long run (Schunk, 1996).

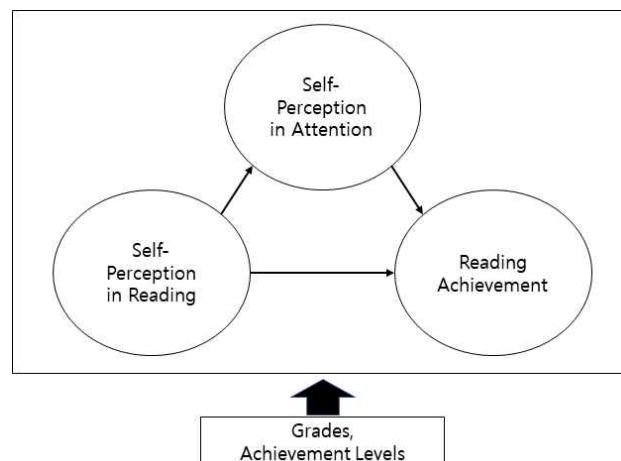
However, numerous former studies have verified that low achieving students typically have negative self-perception of their academic performance. Kim and Lim (2020) clearly showed that middle school low achievers in South Korea have a moderate-sized difference in their academic self-perception compared to average or high achievers. Students who perceive themselves as low achieving may have a negative impact on their lives as a whole in addition to their self-perceptions (Rothman & Cosden, 1995), which is initially induced by repetitive failure in learning at school (Girli, & Ozturk, 2017).

Focusing on the negative self-perception of low achievers, a few studies have demonstrated that the PD-RA relationships of low achieving students are higher than others. For instance, McArthur and colleagues (2020) conducted a meta-analysis on 13 experimental studies regarding the self-perception of poor readers, and the correlation between RA and self-perception of reading, writing, and spelling was stronger in low achieving students. Furthermore, Susperreguy and colleagues (2018) discovered that self-perception of reading predicted later RA even after controlling demographic variables and initial achievement level, and that this relationship was the strongest for low achieving students. Considering the contrasting views regarding PD-RA relationships of low achieving students, it is necessary to confirm whether those relations are different across students' achievement level and then plan customized reading instructions for students at each level.

## 1.2. Research Questions

In view of these considerations, the current study was aimed to discover the structural relationships among PD-A, PD-R and RA of elementary school students (from the third to fifth graders), and the differences of those associations across grades and achievement levels. The research model can be found in the Figure 1, and the specific research questions are as follows:

1. Does the perceived difficulties in attention moderates the effect of the perceived difficulties in reading abilities on the reading achievement of elementary school students?
2. Does the structural relationship among perceived difficulties in attention and reading, and reading achievement show differences among grades (from three to five grades) of students?
3. Does the structural relationship among perceived difficulties in attention and reading, and reading achievement show differences between achievement levels (average and low achievement levels) of students?



[Figure I -1] A research model

## **1.3. Definition of Terminologies**

### **1.3.1. Perceived Difficulties in Attention (PD-A)**

The self-perception of academic abilities can be broadly defined as a perception of one's own competencies, difficulties, and attitudes toward academic tasks (Chapman & Tunmer, 1995). In this study, however, the self-perception specifically focuses on the students' perceived difficulties with their own academic skills, since a measurement tool for self-perception was designed to assess perceived difficulties of each student.

The term "meta-attention" is a similar concept with PD-A. Although the term meta-attention, according to Wu (2017), encompasses both knowledge of attention (e.g., learners' self-perceived attention state and awareness of distractors in the surroundings) and regulation of attention (e.g., the regulatory strategies learners use to help them stay focused), PD-A only indicates the perception of one's own attention state, reflecting affective aspect of attention. In sum, PD-A can be defined as self-perceived difficulties with attention of participants in the present study.

### **1.3.2. Perceived Difficulties in Reading (PD-R)**

In a similar vein, PD-R reflects self-perceived difficulties in reading. To be more specific, as the measurement used to assess PD-R in this study signifies reading skills as decoding and reading comprehension skills (Kim, Kim, & Lee, 2012), this variable can also be explicable as students' perceived difficulties with their own

abilities in decoding and reading comprehension.

### **1.3.3. Reading Achievement**

Reading achievement (RA) encompasses various areas of abilities, which can be summarized as decoding and comprehension skills (Bos & Vaughn, 2002). Decoding skills indicate abilities to link written letters with the sound, while comprehension skills refer to understanding and reconstructing the information acquired from the written sentence or texts (Bos & Vaughn, 2002). Although the proficient decoding skills are required in order to understand the contents of the text properly (Kim & Choi, 2004), the transition from ‘learning to read’ to ‘reading to learn’ is necessary especially for the upper elementary school students (Chapman & Tunmer, 1997). That is, middle childhood students are expected not to have any decoding problems and acquire diverse content knowledge through reading texts. As this study focuses on the relationship between perceived difficulties in one’s academic abilities and RA of elementary school students from grades three to five, it is reasonable to assess the comprehension skills of RA.

There are numerous factors that are known to affect comprehension skills, but vocabulary skills have been identified as the strongest predictor of students’ reading comprehension skills (Cunningham & Stanovich, 1991). This is because vocabulary has a great impact on understanding full sentences comprised of several words (Kim et al., 2016b). Based on the former studies, RA for the current study incorporates students’ vocabulary skills as well as reading comprehension skills.

#### **1.3.4. Low Achievers**

Low achievers are usually defined as students who experience significant deficiency in following general curriculum at school and require intensive academic interventions for a extended period of time (Kim & Lim, 2021). As the current study focuses on RA of students, the level of RA was also used as a criterion of deciding low achieving students. Thus, referencing Kim (2000) that students within 15th percentile from the bottom in their reading performances were designated as reading strugglers, this study also defined low achievers as students who are within the same percentile both in their vocabulary and reading comprehension assessments.



## CHAPTER 2. LITERATURE REVIEW

### 2.1. Reading Development

#### 2.1.1. Reading Developmental Model

Chall (1996) proposed a reading developmental model with six stages in which readers acquire skills in a linear and sequential manner in order of pre-reading skills, decoding skills and comprehension of complex texts. In the first stage (Literacy roots), the pre/emergent reader from birth to age 6 learns important skills for later independent reading. These skills include acquiring concepts of print, letter knowledge, phonemic awareness, and book-handling skills. Children in this stage start to know about functions and purposes of reading and the concepts of book. The second stage (Initial literacy) usually occurs during the first and second years of schooling, and it is the beginning of conventional reading when early readers develop decoding skills such as letter or word recognition and letter-sound correspondences. Monitoring for meaning and knowing how to use strategies to read words are the most important tasks for the readers in this stage. In the third stage (Confirmation, Fluency, Ungluing from Print) of Chall's developmental model, during the second and third grades, readers usually consolidate their decoding skills, build their sight word vocabulary, and increase their reading fluency. The increased sight word vocabulary improves reading accuracy and children begin to attend to the prosodic aspects of text. The major effort during this stage is to make the knowledge that

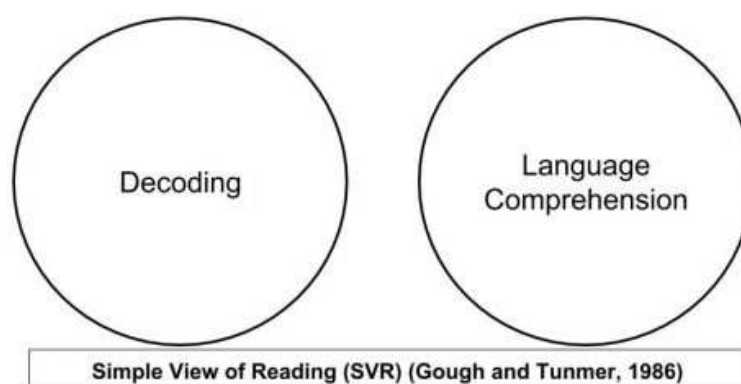
has already been gained more internalized, less, deliberate, and less overt, and finally become unglued from print.

The fourth stage (Reading for Learning the new) occurs through grades 4-8 and is marked by a pronounced shift from “learning to read” to “reading to learn”. There is a corresponding shift in the classroom from an emphasis on narrative stories to expository passages, as the subject of reading becomes more integrated into content area of reading. Metacognition (metaknowledge or metacomprehension) and content knowledge with application of prior knowledge get more importance in this stage. The fifth stage (Multiple viewpoints) involves dealing with more than one point of view. Higher level awareness of one’s own comprehension and meaning production become increasingly important in this stage. In the area of procedural knowledge, knowing how to see from another’s viewpoint and how to analyze and critique while reading emerge as essential components of development. Thus, students in this stage should acquire critical thinking skills. Finally, in the sixth stage (Construction and Reconstruction - A world view), individuals develop an increased capacity to construct knowledge by reading through deeper analysis, synthesis, and application of personal judgment. Readers know better what to skip and are able to be engaged in efficient reading.

Chall’s stage theory was proposed in an era when Piaget’s stage theory of cognitive development was popular so sequential stages of literacy development seemed plausible. However, Chall’s theory suffered from the same criticisms leveled against other stage models, namely, not all children went through the stages in the prescribed order and the stages seemed to under-estimate children’s emerging knowledge and control. For example, Chall claims that

children focus on decoding words in grades 1 and 2 and do not focus on “reading to learn” until fourth grade are contradicted by children’s accomplishments at earlier ages. Development beyond grade 4 also seems inadequately described, as most students in grades 4–8 can read and discuss text from different perspectives. Despite its limitations, Chall’s stage theory suggests the important transition period from “learning to read” to “reading to learn” in 3–4 grades, which comprehension skills are getting more emphasis than decoding ones.

### 2.1.2. Simple View of Reading



[Figure II-1] Simple view of reading

Simple View of Reading (SVR) which was originated to explain reading disabilities suggested that both decoding and language comprehension directly contribute to reading comprehension (Gough & Tunmer, 1986; Hoover & Gough, 1990; see Figure II-1). Decoding articulates abilities to recognize words by connecting phonemes with letters (Aaron et al., 1999). Language comprehension indicates abilities to understand the content of oral language on the bases of lexical, syntatic, and semantic knowledge (Catts et al., 2003). SVR proposes

that individuals will eventually fail to read unless they approach a certain level of decoding and language comprehension skills.

The specific evidence of SVR is as follows. Hoover and Gough (1990) discovered that both decoding and linguistic comprehension explained 71–83% of variances of reading by measuring English skills of 254 English–Spanish dual language learners at the first through fourth grades in elementary schools. Joshi et al. (1998) also concluded that decoding and linguistic comprehension (62%) can more successfully predict reading skills than intellectual abilities (13%) can. Moreover, numerous empirical studies have demonstrated that we are able to discern students who can decode letters but not understand oral language and those who can understand oral language but not decode letters (Hartas & Warner, 2000; Nation & Snowling, 1997).

Studies have also showed that decoding and linguistic comprehension skills have differently contribute to students' reading comprehension abilities according to their school grades (e.g., Hoover & Gough, 1990; Joshi et al., 1998). To be specific, decoding contributes more to the reading comprehension skills than linguistic comprehension at the lower grades (from the first to third), whereas this contribution reverses at the higher grades (from fourth to sixth). Therefore, as children develop, comprehension skills are more important than mere decoding in order to be successful in reading and reading-related activities.

SVR is helpful to understand students with reading disabilities who have great heterogeneity among them. Catts et al. (2003) classified reading disabilities into four categories based on two contributors of reading (see Figure II-2). First, individuals with dyslexia indicate their low achievement in decoding but average

achievement in language comprehension. Dyslexic children perform better when understanding a full sentence than when decoding non-words (Frith & Snowling, 1983). It has been corroborated that they have significant problems in word recognition but have average levels of intellectual ability, since they achieve high in listening comprehension skills that can compensate low decoding skills.

		Decoding	
		Poor	Good
Language Comprehension	Good	Dyslexia	Non-specified reading disabilities
	Poor	Mixed reading disabilities	Specific comprehension deficit

[Figure II-2] Four categories of reading disabilities

Second, specific comprehension deficit is defined as students with good decoding skills in opposition to poor language comprehension skills. These students usually learn how to read before entering elementary schools but have significant difficulties in understanding the contents of texts (Catts et al., 2003). Specifically, their difficulties become apparent in reasoning, and they often do not notice their comprehension deficits due to a lack of self-monitoring of what they have read (Oakhill & Yuill, 1996). Students with specific comprehension deficit also shows low achievement in summarizing and restating the texts they have just read (Cain, 2003).

Third, people with mixed reading disabilities, who can also be defined as backward reader, low achiever, garden-variety poor reader, or language learning disabilities, have deficits in both decoding and language comprehension. The epidemiology of mixed reading

disabilities is similar with that of dyslexia in terms of deficits in phonological processing (Hurford et al., 1994). Suffering from both skills contributing to reading, they are more likely to have deficits in all levels of reading: lexicon, syntax, morphology, and texts.

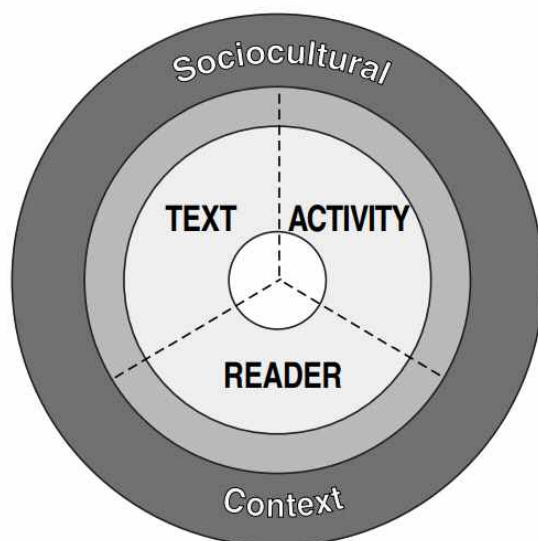
Lastly, students with non-specified reading disabilities definitely have difficulties in reading, but the reason for difficulty cannot be specified from SVR. Due to the emergence of non-specified reading disabilities, scholars have questioned the reliability and validity of SVR. They put consistent efforts to find other contributors to reading comprehension skills, and resultantly a complex effect model has been developed since early 2000s.

### **2.1.3. Complex Effects Model**

The RAND Reading Study Group offered a widely recognized conceptual model to provide a comprehensive framework for development in reading comprehension, informed by proficient readers who are capable (as opposed to unable or disabled) of being engaged in reading process (RAND Reading Study Group, RRSg, 2002). The following statements are the summarization of a Complex Effects Model (CEM) initiated by RRSg (2002).

According to Figure II-3, CEM defines reading comprehension as “the process of simultaneously extracting and constructing meaning through interaction and involvement with written language (RRSG, 2002, pp. 11).” Comprehension skills incorporate three elements: the reader (doing the comprehending), the text (comprehended), and the activity (being a part of comprehension). These three elements occur within a larger socio-cultural context. Therefore, CEM proposes that we can predict

one's reading comprehension skills by understanding the characteristics of reader, text, activity, and sociocultural context.



[Figure II-3] Complex Effects Model

**Reader** A wide range of abilities are required for readers to comprehend the written texts. These abilities may include cognitive factors (e.g., attention, memory, inferencing, critical analytic thinking), motivations (e.g., self-perception of their own abilities, attitude, engagement, interests in the contents), and various types of knowledge (e.g., domain-specific knowledge, vocabulary, knowledge of comprehension strategies, other linguistic and discourse knowledge). As a reader start to read and be engaged in reading-related activities, the abilities and knowledge of the reader change. For instance, readers' fluency and lexical knowledge may increase as a function of the additional practice in reading. Motivational elements might also develop in either a positive or negative direction during a successful or failing reading experiences. Therefore, teachers should put their efforts on helping students learn how to become self-regulated, active readers as well as increase overall reading fluency and linguistic

knowledge.

***Text*** The features and characteristics embedded in text have a large impact on reading comprehension. Nowadays, the prevalence of computers and smartphones broadened the definition of text to incorporate electronic text and other multimedia documents as well as conventional printed ones. Texts can be difficult or easy, depending on the factors such as the relationship between the text and the knowledge level or abilities of the reader, and the activities where the reader is engaged. When the type or content of texts are inappropriately matched with these factors, the text may be too difficult for optimal comprehension to occur. Thus, it is important for teachers to select the text that can successfully match children's current reading abilities, interests, and engaged activities.

***Activity*** Activity refers to the purpose of reading to achieve some end, some operations to process the text at hand, and the consequences of reading. Prior to reading, a reader has a certain purpose that can be either externally forced or internally generated. This purpose of reading is significantly influenced by the motivation to read as well as interest and prior knowledge. For example, when a reader was imposed to read a certain text that is far from one's interests, the reader would probably unwilling to be engaged in the reading activity. During the reading, the reader processes the text beyond decoding, higher-level linguistic and semantic processing and monitoring. Each process can be different according to the various types of reading (e.g., skimming or studying). After reading, the activity may lead a reader to increase the knowledge, find out how to do something, and be engaged in the contents. These consequences of reading are varied in terms of the type of texts the reader is engaged in.



**Context** Readers' purpose for reading, concrete processes to read, and consequences of reading are influenced and shaped by the context of instruction. Sociocultural and sociohistorical theories of learning and literacy describe how students acquire literacy through social interactions with more expert peers and adults (e.g., theories initiated by Vygotsky). With the guidance of more skilled readers or experts, students can read texts that are slightly beyond their original independent knowledge or capacities. From this perspective, both the process of how instruction is delivered and the focal content of instruction are the most important factors. As children's acquisition of knowledge and reading skills is influenced by the various types of the sociocultural contexts (e.g., the identity of the participants, how the activity is defined or executed, the timing of the activity, where it occurs, and why children should participate in the activity; Tharp & Gallimore, 1998), teachers should consider the contexts surrounding students in order to adapt their instruction and optimize its effectiveness.

More recently, scholars have begun to move beyond the CEM of RRSRG by specifying direct and indirect effects of a variety of individual differences on reading comprehension (Barber et al., 2020). The proposed models are varied in the targeting individual difference variables, but they posited similar lower level (e.g., word reading, vocabulary, oral language comprehension) and higher level (e.g., strategic processes, inference-making skills) contributors. They assumed that the lower level skills usually contribute indirectly through the higher level skills to reading comprehension (Barber et al., 2020). To be specific, studies have shown that vocabulary indirectly contributes through higher order strategic process to reading comprehension skills (Cromley & Azevedo, 2007; Cromley et

al., 2010). In sum, as the CEM is regarded as a more convincing model to understand and predict children's reading comprehension skills, researchers are necessary to consider these multiple components while designing experiments.

## **2.2. Self-Perception**

### **2.2.1. Definition of Self-Perception**

The self-perception is an impression that a person has of his/her competency or problems in various domains or contexts (Harter, 1986; Heyman, 1990). self-perception in a certain domain is a critical component of self-esteem (Bong & Skaalvik 2003), or global self-worth, which is formulated through life experiences and shaped by environmental and personal relationships. self-perception is also positively related to how much children are engaged in and enjoy language-related activities, how likely they are to choose more challenging materials, and their effort and perseverance when facing difficult tasks (Malanchini et al., 2017).

Self-perception, in a broad sense, incorporates similar concepts such as self-concept and self-efficacy. Simply put, self-concept reveals the answer for who I am, while self-efficacy indicates the answer for how much I can achieve in a certain task (Ormrod, 1990). Bong and Skaalvik (2003) proposed that self-efficacy and self-concept differ in important ways. Self-efficacy comprises of goal referenced, context-specific judgments of competence that are relatively flexible, whereas self-concept is hierarchically structured, past-orientated

self-perceptions that are relatively stable due to their generality. Because of these differences, self-efficacy beliefs are potentially more changeable in response to intervention, and it was further suggested that self-efficacy acts as a precursor for self-concept development. However, we should be aware that self-perception, self-concept, and self-efficacy are all previously been conceptualized as ability beliefs, self-efficacy, or competence, and thus there are no significant differences among those concepts (Renninger & Hidi, 2016). As self-perception refers to children's beliefs regarding ability and proficiency in domain-specific tasks, perceptions of experiencing reading as a difficult task, and attitudes towards a specific domain, it is reasonable to assume that self-perception encompasses other two variants.

### **2.2.2. Development of Self-Perception**

There are some contrasting views regarding when self-perception can be formed and affect students' achievement during their development. Blumenfeld and colleagues (1982) discovered that students before the fourth grade are not able to perceive their own abilities accurately. Similarly, Henk and Melnick (1995) proposed that intermediate graders at elementary school start to perceive their performances based on their performance levels more objectively. Chapman and Tunmer (1997) also suggested that young children who just started to learn reading do not develop self-perception of their academic abilities, while students who learned how to read over two and a half years may do.

However, Morgan and colleagues (2008) found that even six months into the first grade, students with poor emergent literacy

skills already had weaker reader self-concepts than their peers. The difference in self-perception of this age then remained stable over a three-year period despite significant improvement in the decoding skills of the children with poor reader self-concepts. Furthermore, a study of first-graders in New Zealand showed that students with poor emergent literacy skills reported more negative reader self-ability beliefs than their peers, even as early as six to eight weeks into the first grade (Chapman, Tunmer, & Prochnow 2000). Although these studies supports self-perception may develop and be formed earlier than former studies have proven, it is also important to note that RA can be diversified in terms of decoding skills and comprehension skills.

The strength of PD-RA relationship changes with age (Huang, 2011). Carroll and Fox (2017) found that, among younger children (8- to 11-year-old), self-perception was positively related to fluency but not to reading comprehension. Others have found a positive association between self-perception and both reading fluency and comprehension among students in Grade 5 and 7 (Ho & Guthrie, 2013; Mercer et al., 2011). Similarly, by grade 4, self-perception and reading comprehension skills are positively correlated after controlling students' verbal and word reading skills (Katzir, Lesaux, & Kim, 2009). These findings suggest that self-perception are differently related to reading fluency and comprehension in the early school years. Since the present study aims to investigate the relationship between self-perception and RA, specifically vocabulary and reading comprehension skills, it is more reasonable to collect a sample from upper elementary school students, instead of students from lower grades.

The changes in self-perception are known to be rather small,

and stable over time once developed (Marsh, Craven, & Debus, 1991). Researchers found no evidence for considerable grade-level differences in the relationship between self-perception and RA between students in Grade 4, 7, and 10 (Shell et al., 1995). Therefore, in order to prevent negative (poor-get-poorer) Matthew effects in reading, considerations for various factors affecting students' self-perception, including successful early reading experiences, are necessary (Morgan et al., 2008).

Bandura (1977) proposed four social cognitive factors that influence and develop individuals' self-perception: progress, observational comparison, social feedback, and physiological state. First, the progress refers to how one's perception of present academic performance compares with past performance. This can be corroborated by other studies that students who have some experiences of being successful in a certain task or area have more confidence of being successful in the same task or area again (Bandura, 1986; Valentine, Dubois, & Cooper, 2004). In the same sense, Deacon, Cook, and Parrila (2012) pointed out that an individual's perception of their past reading difficulty could be significantly altered by their past environment and circumstances. Secondly, the observational comparison indicates how a child perceives one's own reading performance to compare with the performance of other classmates. Third, the social feedback which is the most frequently used method refers to a direct or indirect input about academic abilities from teachers, classmates, and family members. Empirical studies have found that the positive self-perception is usually formed by positive feedbacks from significant others such as parents and teachers (Marsh et al., 1994; Hay et al., 2006). However, it is also necessary to note that a

performance feedback followed by a student's reflection process guarantees the enhancement of positive self-perception (Forster & Souvignier, 2014). Lastly, the physiological states indicate internal feelings that the child experiences during academic tasks. These four components affect one's self-perception while being inter-correlated (Marshall & Weinstein, 1984). Based on Bandura's framework, Peura and colleagues (2021) recently discovered trajectories of change in reading self-perception through longitudinal data. The results showed that high levels of progress, positive feedback, and vicarious experiences combined with a lower level of physiological states predicted positive developmental trajectories, whereas downsizing positive feedbacks and vicarious experiences led students to negative trajectories.

### **2.2.3. Perceived Difficulties in Attention and Reading**

The main function of attention is to select information for further processing while inhibiting other information from being processed (Pashler, 1998). From the perspective of information processing, before engaging in cognitive activities, learners go through a stage of attention, which consists of three subsystems: the alerting, orienting, and detecting/executive systems (Petersen & Posner, 2012). The alerting system maintains an alert state while searching for the target. The orienting system directs attention to sensory input or thoughts. The detecting/executive system detects signals of the main target, but is later renamed "executive" because of its top-down control signal processing in detecting the target due to its limited attention capacity (Petersen & Posner, 2012). Petersen and Posner (2012) called the executive process focal attention and noted that it is

the pathway to the cognitive activities. Therefore, attention plays a critical role in initiating cognitive learning activities, including interpreting and understanding reading materials.

It should also be noted that there is a plethora of research demonstrating attention is the good predictor of students' RA. Reading requires sustained attention in order to maintain an active representation of the text being read. Silva-Pereyra et al. (2010) found that poor readers, defined as the ones having reduced word recognition or reading comprehension skills, performed significantly poorer on a measure of sustained attention, compared to those individuals with typically developing reading ability. Sustained attention has also been shown to predict decoding in elementary school students, independent of phonological skills (Bosse & Valdois, 2009). Poor sustained attention, in contrast, has been shown to negatively impact reading comprehension. For example, students with more frequent periods of inattention during reading also performed poorer on the reading comprehension assessments (Smallwood, McSpadden, & Schooler, 2008). In a study of school-aged children with and without attention deficits, sustained attention which was measured by an inattention score from the Stop Signal task predicted the ability to tell a story to an examiner using a picture book prompt (Flory et al., 2006). Across studies, the findings suggest that sustained attention contributes to both decoding and comprehension skills in reading.

Not only the attention itself, but also the perception in one's own attention abilities can be useful for predicting reading outcomes of learners at school. The awareness or perceived difficulties in one's own attention can be also conceptualized as "meta-attention." Although the term meta-attention, according to Wu (2017),

encompasses both knowledge of attention (e.g., learners' self-perceived attention state and awareness of distractors in the surroundings) and regulation of attention (e.g., the regulatory strategies learners use to help them stay focused), perceived difficulties in attention (PD-A) only indicates the perception of one's own attention state. Compared to attention or self-perception in general, PD-A is less researched area (Reisberg & McLean, 1985).

However, through a few empirical studies, it was demonstrated that PD-A is able to predict students' academic achievement and learning-related outcomes. For instance, Loper and Hallahan (1982) detected statistically significant relationship between PD-A and achievement, and Loper, Hallahan, and Ianna (1982) also found that negative PD-A of students with learning disabilities led them to low academic performances. Wu (2017) revealed from the multilevel structural equation model that media multi-tasking self-efficacy can impact learning performance via students' perceived attention problems.

In this study, I investigated the additional relationship with PD-A and PD-R, as a part of generalization of PD-R into perceived difficulties in other academic abilities. The perceived consequence value of readers and text difficulty influenced their affect and attention, which can lead to the consequence of learning (Mills, D'Mello, & Kopp, 2015). Since PD-A is highly correlated with both learner's levels of attention and affect in regard to learning (Burek & Martinussen, 2020; Loper, Hallahan & Ianna, 1982), it can be postulated that PD-A is able to be predicted by PD-R. This hypothesis can be further corroborated by the age PD-A and PD-R are sophisticatedly formed. PD-R may start to be formulated after six months of the first grade (Morgan et al., 2008) and significantly



associated with reading by the fourth grade (Carroll & Fox, 2017), while PD-A can still be changed after the fifth grade (Loper & Hallahan, 1982). Therefore, it is highly likely that PD-R influences the formation of the malleable PD-A, not in vice versa. Based on this argument, I investigated the mediating effect of PD-A on the associational path from PD-R to RA and demonstrated that additional educational intervention for enhancing PD-A may also leverage positive consequence in reading achievement instead of directly improving PD-R which is more static than PD-A.

#### **2.2.4. Strategies to Monitor Attention**

Kim (2010) developed an intervention program to instruct strategies of monitoring students' own attention process. It includes three lessons with 40 minute duration for each: (1) facilitating attention, (2) visual attention, and (3) auditory attention. During the first session, students explicitly learn self-affirmation and self-assessment strategies during reading activities. During the second and third session, teachers give students abundant opportunities to use attention-monitoring strategies mastered in last lessons. Through the learning activities, students are able to be accurately aware of both their current and improved state of attention. As this program also emphasizes the linkage between strategies and school curriculum, students are expected to apply these strategies at classroom even after the program is terminated as well as improve their overall academic skills in the long run. Figure II-4 and II-5 show worksheets to teach concrete strategies to monitor one's own attention.

㉠ 전략의 단계와 내용을 살펴봅시다.

단계	단계 내용
1 단계	공부 시간을 정하고 공부 중 학생에게 시간적 단서를 줄 수 있는 알람시계 기능이 있는 휴대폰을 준비한다.
2 단계	휴대폰에 5분 간격으로 알람을 한다(예: 10시 5분, 10시 10분, 10시 15분……).
3 단계	학습을 시작하고 알람이 울리면 자신에게 '나는 지금 집중을 하고 있는가?'라는 질문을 한다.
4 단계	질문에 대한 답에 빨리 √ 표시 하고 다시 수업에 집중한다.
5 단계	학습 후 자신의 √ 표를 확인한다.











나의 공부 시간은 (9시 30분~10시 10분)입니다.		
나는 지금 집중을 하고 있는가?		
알람시간	예	아니요
9시 35분	√	
9시 40분	√	
9시 45분		√
9시 50분	√	
9시 55분		√
10시 00분	√	
10시 5분	√	
10시 10분		√
합계	5	3

[Figure II-4] A Worksheet to Monitor Attention 1  
(Kim, 2010)

㉠ 집중력 높이기 약속을 하고 일정 기간 실천해 봅시다.

**집중력 높이기 약속!**  
 ( 홍길동 )은 1 월 1 일부터 1 월 5 일까지  
 '집중력 높이기!' 활동을  
 연습할 것을 선생님 앞에 약속합니다.

약속일: 1 월 1 일  
 약속자: 홍길동

자기평가 결과 색칠하기					
월 일	1월 1일	1월 2일	1월 3일	1월 4일	1월 5일
오늘 목표	2	3	3	4	5
목표 달성					
목표 달성 실패					
다음번 목표	3	3	4	5	6

[Figure II-5] A Worksheet to Monitor Attention 2  
 (Kim, 2010)

## 2.3. Perceived Difficulties and Reading Achievement

### 2.3.1. Two Models on PD-RA Relationship

RA has often been related to PD through a plethora of former

studies, but there is no one definitive model to explain how this association chronologically develops. There were two unidirectional models to approach the relationship between PD and RA: a skill development model and a self-enhancement model (Malanchini et al., 2017).

First, according to the skill development model, the positive experiences contribute to the positive feeling that further builds up confidence and motivation of the learners to pursue reading even the more challenging texts (Ruddell & Unrau, 2004). For instance, it has been shown that extremely positive self-perception without the required knowledge and skills will not result in improved RA (Schunk, 1996), and can result in reduced effort in reading. This influence of achievement on subsequent self-perception is central to the Skill Development Model. For example, children at risk for reading failure are more likely to encounter difficulty and frustration in their early reading experiences, which may lead to decreased negative self-perception of reading (Calsyn & Kenny, 1977). The support for this model has been inconsistent. Morgan and colleagues (2008) failed to observe improvements in children's reading self-perception as a consequence of improved RA in a group with reading disabilities. In contrast, several longitudinal studies have supported the temporal precedence of RA on self-perception in groups from early elementary school to middle school ages. These studies utilized cross-lagged longitudinal analyses in which the longitudinal effect of one construct on another is estimated beyond the stability of each construct and the concurrent correlation between constructs. Specifically, these studies demonstrated that individual differences in children's reading performance predicted subsequent variation in children's reading motivation, whereas reading motivation failed to

predict subsequent reading performance (Aunola et al., 2002; Chapman & Tunmer, 1997; Skaalvik & Valas, 1999). However, these studies involved relatively small samples and may have been underpowered to detect potential causal relation from PD to RA and contrasting examples that low PD leveraged RA.

According to the Self-Enhancement Model, individual differences in self-perception influence subsequent development of RA, but the achievement level does not affect the development of self-perception (Schober et al., 2018). Confident and interested readers are more invested in learning and mastering reading skills through frequent reading, and this frequent print exposure further results in better reading skills (Calsyn & Kenny, 1977). Children who have positive associations with reading are more likely to devote themselves to reading tasks, for a more extended time period, while those who have negative associations avoid, disengaged in, and uncommitted to reading-related activities (Alvermann, 2008; Strahan, 2008), which may lead to significant reading difficulties in the future (Spaulding, 1992). Galla and colleagues (2014) also supported that students' scores in standardized reading assessments were higher for students who reported their academic self-perception more positive. This effect was mediated by the students' level of effortful engagement in academic situations. Thus, academic self-perception is one important precursor of engagement, leveraging higher RA in the long run.

There have been a plethora of empirical studies supporting the self-enhancement model. Hay, Ashman, and Van Kraayenoord (2006) suggested developing reading skills is a product of positive self-perception that progressively develops from pleasant experiences in school or from significant others for the first two years of his

schooling. This positive correlation is not limited to a certain type of texts for reading, and predict the future RA (Kwon & Linderholm, 2014). Stringer and Heath (2008) measured reading, math, and academic self-perception of 144 children at age 10 and a year after the first assessment. As a result, self-perception at age 10 predicted the 16-25% of the variance in academic achievement at age 11, which suggests the influence of self-perception on academic achievement may be domain-general. Moreover, Hall (2012) investigated the sixth graders' text comprehension skills and strategies in terms of their self-perception and RA levels, and corroborated the causal relationship of the change in self-perception on the change in learning strategies. Students who perceive themselves as a proficient reader are more likely to talk about what they read and newly learned strategies that proved to be effective for enhancing reading skills. In contrast, children who perceive they are on the low or average level in reading skills utilize reading strategies that have been often used by them, instead of trying newly learned ones.

### **2.3.2. PD-RA Relationship of Low Achievers**

The fundamental reason for investigating PD-RA relationship is because of the negative Matthew effect initially raised by Stanovich (1986), which indicates the poor gets poorer. In other words, it becomes increasingly difficult for children to get back on the road of proficient reading once they have entered the swamp of negative expectations (Spear-Swerling & Sternberg, 1994). The negative Matthew effects are triggered by various factors such as phonological processing skills of early years (Morgan et al., 2008) and early reading failure (Tunmer & Nicholson, 2011). As a result of those

factors, struggling readers also develop a high level of PD-R and therefore do not try as hard as other students because of their low expectations of success (Chapman & Tunmer, 2003). In sum, what began as weaknesses in literacy-related skills gradually develops into a downward spiral of achievement deficits and negative behavioral and motivational spinoffs (Prochnow, Tunmer, & Chapman, 2013). Therefore, it is highly important to study the PD-RA relationship of low achieving students and prevent them from this vicious cycle.

As the associations between predictors and academic achievements depend on the level of the achievement itself (Petscher & Logan, 2014), some studies discovered that PD-RA relationship of low achievers is known to be weaker than that of average achievers (Heath & Brown, 1999). One of the convincing hypotheses that explains this relatively low PD-RA correlation of low achieving students is the “self-protection hypothesis (Heath & Glen, 2005).” The self-protection hypothesis maintains that low achievers tend to distort their own self-perception in order to protect themselves from negative emotional outcomes derived from academic failures. To be more specific, students struggling with reading are more likely to exaggerate their own ability to a larger extent than average readers (Dunning et al. 2004).

This tendency may put low achieving readers particularly in danger of the vicious cycle (Kwon & Linderholm, 2014), since overestimating inclination in terms of perceiving their reading skill level contributes to sustaining such a level of capability by overestimating their reading performance with specific texts as well (Linderholm et al. 2008). In other words, students in overconfidence compared to their actual performance will slack off in their efforts, which can retard future learning. Although there are some contrasting

facts that students who had extremely positive self-perception were more likely to work harder, persevere and seek support to finish a task (Linnenbrink & Pintrich, 2003), it is more widely supported that positive self-perception without the required knowledge and skills will not result in improved RA in the long run (Schunk, 1996).

However, numerous former studies have verified that low achieving students typically have negative self-perception on their academic performances. Kim and Lim (2020) clearly showed that middle school low achievers in South Korea have moderate-sized differences in their academic self-perception compared to average or high achievers. Students who perceive themselves as learning disabilities or low achievers may have negative impacts on their lives as a whole as well as their self-perceptions (Rothman & Cosden, 1995), which is initially induced by repetitive failure in learning at school (Girli, & Ozturk, 2017).

Focusing on the negative self-perception of low achievers, a few studies have demonstrated that the PD-RA relationships of low achieving students are higher than others. For instance, McArthur and colleagues (2020) conducted a meta-analysis on 13 experimental studies regarding the self-perception of poor readers, and the correlation between RA and self-perception of reading, writing, and spelling was stronger in low achieving students. Furthermore, Susperreguy and colleagues (2018) discovered that self-perception of reading predicted later RA even after controlling demographic variables and initial achievement level, and that this relationship was the strongest for low achieving students.



## CHAPTER 3. METHODS

### 3.1. Sample

Data were collected from March 24<sup>th</sup> to April 14<sup>th</sup> of 2021, in six schools in K province, South Korea. The total sample consisted of 1,405 elementary school students (732 boys, 673 girls) in grades 3–5 (471 3rd, 426 4th, and 508 5th graders) who completed group tests in PD-R, PD-A, and RA offline. Among them, the number and proportion of students from multi-cultural family were 142 (10.1%). Specific dates of tests conducted can be found in Table III-1.

[Table III-1] Dates of data collected

Dates Tested	School Codes	Grades Tested
March 24, 2021	A	3, 4, 5
March 29, 2021	B	3, 4, 5
	C	5
March 31, 2021	C	3, 4
April 5, 2021	D	3, 4, 5
April 6, 2021	E	3, 4
April 7, 2021	E	5
April 8, 2021	F	5
April 14, 2021	F	3, 4

Among participants, low achievers were selected based on the results of RA. Children who were situated within 15th percentile from the bottom in both of RA assessments were designated as low

achievers, referencing Kim (2000), Kim (2019a), and Kim (2019b). For deciding high achievers, children who were situated within 15<sup>th</sup> percentile from the top (85th percentile from the bottom) were selected. Average achieving students are the remainders of low and high achievers. In this study, the number and proportion of high, average, and low achievers were 10 (0.7%), 760 (54.1%), and 635 (45.2%) each.

## **3.2. Measures**

### **3.2.1. Self-Perceptions in Reading and Attention**

Students' self-perceptions were assessed with items from the Learning Disability Screening Test (LDST; Kim, 2012), designed to identify the domain-specific difficulties of elementary school students and to screen students at high risk for learning disabilities. LDST consists of five independent constructs such as receptive language (reading), expressive language (speaking and writing), math, attention & organization, and sociality, with a total of 26 items. All of these items were made up of a three-Likert scale (1-Never, 2-Sometimes, 3-Always), which is enough simple for elementary school students to respond. The higher score of each construct indicates a higher level of self-perceived difficulties in the targeted skills. The self-report of elementary school students who are older than the third grade are regarded accurate, thus the self-report scales were used.

In this study, children responded only eight items which measure perceived difficulties with attention and reading (see Table

III-2 for the detailed contents of each item used). For measuring the PD-A with four items (item number 16 through 19), students reported their perceived challenges with sustaining their attention, especially in classroom activities. For the PD-R with four items (item number one through four), participants checked their perceived difficulties with decoding, vocabulary, and reading comprehension skills. The values of Cronbach’s alpha (internal reliability) for the PD-R and PD-A were turned out to be 0.63 and 0.62 each, based on the collected data of the present study.

[Table III-2] Items measuring perceived difficulties

Areas	Items
PD-Reading	1. I take a lot of time or feel difficult when reading words I have never seen before.
	2. I make many errors when reading out loud.
	3. I do not know the meanings of words I read.
	4. I feel difficult to understand the contents after reading.
PD-Attention	16. I feel difficult to differentiate numbers or letters that look similar.
	17. I feel difficult to differentiate words that sound similar.
	18. I feel difficult to understand and follow the directions of teachers.
	19. I usually forgot what I learned on that day.

### 3.2.2. Reading Achievement

To measure students’ reading achievement, two standardized reading assessment tools were utilized. First, Basic Academic Skills Assessment: Vocabulary (BASA: V; Kim, 2019a) measured vocabulary skills of elementary school students. As BASA: V has customized

sets of items for each grade, students solved items that are matched with their grade. This tool includes three constructs: explicit definition (18 items), situational context (13 items), and morphological analysis (11 items). The vocabularies used in those items were selected through the descriptive statistics on educational vocabularies used in Korean textbooks for elementary school 3–6 graders. Students were assigned to solve a total of 42 items for 15 minutes. The responses of each children were scored 1 for the correct answers, and 0 for the incorrect ones. As the items for each grade were different, standardized scores (T-scores) were used for the statistical analyses in order to compare scores from the different metrics. The value of Cronbach's alpha for this assessment was turned out to be 0.819 (Kim et al., 2016a).

Secondly, Basic Academic Skills Assessment: Reading Comprehension (BASA: RC; Kim, 2019b) was used to measure children's reading comprehension skills. Since this tool is also customized to the grades of children just as BASA: V, students of different grades solved a different set of items. BASA: RC is comprised of three constructs: factual understanding, inferential understanding, and evaluative understanding. Students were assigned to solve 28 items for 15 minutes, and the scoring system was identical with that of BASA: V. Standardized scores (T-scores) were calculated from the raw scores of each children in order to be utilized for the statistical analyses. The internal reliability (Cronbach's alpha) for this measurement tool was revealed as 0.866 (Kim et al., 2017).

### **3.2.3. Covariates**

Child sex (male=0; female=1) and whether a child is from a multi-cultural family (mono-cultural=0; multi-cultural=1) were

controlled in all analyses. This information was collected from homeroom teachers of participants.

### **3.3. Data Analysis**

#### **3.3.1. Preliminary analysis**

The Statistical Package for the Social Sciences (SPSS) ver 22.0 software was used to operate the descriptive statistics and Pearson correlation analyses. The descriptive statistics analysis aimed to report the covariance matrix and also confirm whether the data fulfill the normality assumption, which is a necessary condition to conduct a structural equation modeling (SEM). As the absolute values of skewness were under 3 and those of kurtosis under 10, we decided the variables used in this study fulfilled the normality assumption (Kline, 2011).

Furthermore, as a part of preliminary analysis to conduct multi-group analyses by grades and achievement levels, Pearson correlation and descriptive statistics analyses by these subgroups (i.e., 3rd, 4th, and 5th grade students; average and low achieving students) were conducted. One-way ANOVA was additionally performed to identify the statistical differences in the means of all observed variables among the identical subgroups.

#### **3.3.2. Mediation effect analysis**

To test the structural relationship among PD-R, PD-A, and RA of

elementary school 3rd–5th grade students, a two-step approach to the lavaan package on the R statistical program was used (Anderson & Gerbing, 1988). In the first step, a confirmatory factor analysis (CFA) was conducted to verify whether observed variables successfully measured PD-R, PD-A, and RA. During CFA, fit index, discriminant validity, and convergent validity were confirmed. Based on the recommendations by Jackson et al. (2009) and Kline (2010), the CFI (Comparative Fit Index), TLI (Tucker-Lewis Index), and RMSEA (Root Mean Square of Approximation) were used as fit index. Results higher than 0.90 were accepted for CFI and TLI, and results below 0.08 were regarded as a good fit for RMSEA. The correlation lower than 0.85 between latent variables verified the discriminant validity of a CFA model (Kaplan, 2008). To check convergent validity, all factor loadings had to be at least 0.30, based on the conclusions of Nunnally (1978).

The second step – the structural equation modeling (SEM) analysis – aimed to confirm an overall fitness of the research model and the statistical significance of each path coefficients. Two competitive models were set: direct and indirect mediation models. A direct mediation model indicates that PD-R has a great impact on RA only through PD-A, and the direct effect of PD-R on RA may not be significant. However, since an indirect mediation model allows the direct effect of PD-R on RA, PD-R can affect RA through two pathways. By performing the ANOVA method, the final research model was decided. Additionally, by using a bootstrap method (N=5,000), the mediation effect of PD-R on the relationship between PD-A and RA was confirmed.

### **3.3.3. Multi-group analysis**

To compare the relationship among grades or achievement levels of students, factor invariance, which refers to the extent that items in the measure have the same meaning among groups, was considered (Meredith, 1993). If factor invariance is not fulfilled, group comparisons on the measured variables would have ambiguous and unreliable interpretations (Millsap & Olivera-Aguilar, 2012). Factor invariance is generally conceptualized on a hierarchical structure assessed through the application of incrementally restrictive constraints. In the current study, factor invariance of multi-group models were tested in three steps. In the first step, configural factor invariance, which assesses an unconstrained multi-group model wherein the parameters are freely estimated, was tested. Thereafter, metric factor invariance, which is a requisite for comparing covariance, correlations or regression coefficients, was tested by constraining the factor loadings of the baseline model. Finally, scalar factor invariance, which is a requisite for comparing means between groups, was tested by constraining the factor loadings and intercepts.

To test the factor invariance in each step, the  $\Delta$ CFI and  $\Delta$ RMSEA of the multiple group models were calculated. According to Chen (2007), when sample size is adequate (total  $N > 300$ ) and sample sizes are equal across the groups, a change of  $\geq -.010$  in CFI, supplemented by a change of  $\geq .015$  in RMSEA would indicate noninvariance. In the case that does not fulfill the metric invariance, a partial metric factor invariance that deletes a constraint of one factor loading which shows the biggest difference among groups was acknowledged (Byrne, Shavelson, & Muthen, 1989). However, in the case of not fulfilling the scalar invariance, I identified which path coefficients show differences across different groups by constraining

one path at a time (Kim & Lim, 2020).

### 3.4. Missing Data

In order to decide how to process the missing data, we firstly evaluated whether the data were missing completely at random (MCAR). As there were no missing data within the variables that are assessed at the same time point, the results of Little's MCAR test was primarily due to the missing data across the different time point. By conducting Little's MCAR test (Little, 1998), the results demonstrated that the data were not MCAR (NMAR;  $\chi^2 = 324.00$ ,  $df=129$ ,  $p < .001$ ). However, even in the case of NMAR, deleting the case with missing data or replacing missing data with the mean of each variable are not the best method to utilize available information (Woo & Yoon, 2008). Thus, it is more recommended to use full information maximum likelihood (FIML) which do not impute scores for missing data but instead utilize the raw data to establish parameter estimates (Enders & Bandalos, 2001). In addition, since there are a few possibilities that covariates (e.g., child sex and multicultural backgrounds) may be related to the MCAR assumption (Hentges et al., 2019), potential bias due to those covariates were limited along with using FIML.



## CHAPTER 4. RESULTS

### 4.1. Preliminary Analysis

The results of descriptive statistics and correlation analyses on major variables (i.e., PD-R, PD-A, and RA) were showed in the Table IV-1 through IV-4. Specifically, Table IV-1 indicated the results measured by a total sample (N=1,405), while Table IV-2 presented the results of Pearson correlation analyses by grades and achievement levels, which are necessary to conduct subsequent multi-group analyses. Throughout those two tables, PD-R and PD-A had a positive correlation with each other, whereas PDs showed negative correlations with RA.

[Table IV-1] Descriptive statistics and correlations on major variables

	PD-R	PD-A	RA
PD-R	1		
PD-A	0.53 <sup>***</sup>	1	
RA	-0.38 <sup>***</sup>	-0.36 <sup>***</sup>	1
Mean	1.69	1.34	36.86
Standard Deviation	0.44	0.39	10.88
Skewness	0.53	1.23	-0.10
Kurtosis	0.11	2.33	0.20

<sup>\*\*\*</sup>  $p < .001$

[Table IV-2] Correlation coefficients by grades and achievement levels

3 <sup>rd</sup> grade	PD-R	PD-A	RA
PD-R	1		
PD-A	0.43 <sup>***</sup>	1	
RA	-0.41 <sup>***</sup>	-0.33 <sup>***</sup>	1
4 <sup>th</sup> grade	PD-R	PD-A	RA
PD-R	1		
PD-A	0.58 <sup>***</sup>	1	
RA	-0.36 <sup>***</sup>	-0.37 <sup>***</sup>	1
5 <sup>th</sup> grade	PD-R	PD-A	RA
PD-R	1		
PD-A	0.58 <sup>***</sup>	1	
RA	-0.36 <sup>***</sup>	-0.38 <sup>***</sup>	1
Average achiever	PD-R	PD-A	RA
PD-R	1		
PD-A	0.46 <sup>***</sup>	1	
RA	-0.28 <sup>***</sup>	-0.22 <sup>***</sup>	1
Low achiever	PD-R	PD-A	RA
PD-R	1		
PD-A	0.53 <sup>***</sup>	1	
RA	-0.26 <sup>***</sup>	-0.27 <sup>***</sup>	1

\*\*\*  $p < .001$

The summarized results of descriptive statistics and correlation analyses on every observed variable were also suggested in Table IV-3. As all absolute values of skewness were under 3 and those of kurtosis were under 10, the variables used in this study fulfilled the normality assumption (Kline, 2011).

[Table IV-3] Descriptive statistics and correlations on observed variables (N=1,405)

	1	2	3	4	5	6	7	8	9	10	11	12
1. PD-R-1	1											
2. PD-R-2	0.24 <sup>a</sup>	1										
3. PD-R-3	0.31 <sup>a</sup>	0.22 <sup>a</sup>	1									
4. PD-R-4	0.35 <sup>a</sup>	0.27 <sup>a</sup>	0.32 <sup>a</sup>	1								
5. PD-A-1	0.21 <sup>a</sup>	0.24 <sup>a</sup>	0.21 <sup>a</sup>	0.25 <sup>a</sup>	1							
6. PD-A-2	0.25 <sup>a</sup>	0.31 <sup>a</sup>	0.24 <sup>a</sup>	0.31 <sup>a</sup>	0.40 <sup>a</sup>	1						
7. PD-A-3	0.30 <sup>a</sup>	0.27 <sup>a</sup>	0.21 <sup>a</sup>	0.35 <sup>a</sup>	0.38 <sup>a</sup>	0.34 <sup>a</sup>	1					
8. PD-A-4	0.23 <sup>a</sup>	0.30 <sup>a</sup>	0.21 <sup>a</sup>	0.26 <sup>a</sup>	0.25 <sup>a</sup>	0.27 <sup>a</sup>	0.33 <sup>a</sup>	1				
9. vocabulary	-0.29 <sup>a</sup>	-0.17 <sup>a</sup>	-0.20 <sup>a</sup>	-0.28 <sup>a</sup>	-0.32 <sup>a</sup>	-0.26 <sup>a</sup>	-0.29 <sup>a</sup>	-0.18 <sup>a</sup>	1			
10. reading comprehension	-0.30 <sup>a</sup>	-0.19 <sup>a</sup>	-0.21 <sup>a</sup>	-0.29 <sup>a</sup>	-0.31 <sup>a</sup>	-0.26 <sup>a</sup>	-0.25 <sup>a</sup>	-0.16 <sup>a</sup>	0.74 <sup>a</sup>	1		
11. child sex	-0.04	-0.02	-0.03	-0.04	-0.07 <sup>c</sup>	0.00	-0.03	-0.03	0.19 <sup>a</sup>	0.20 <sup>a</sup>	1	
12. multicultural	0.05 <sup>b</sup>	0.05	0.05	0.06 <sup>b</sup>	0.09 <sup>a</sup>	0.06 <sup>b</sup>	0.08	0.02	-0.09 <sup>a</sup>	-0.09 <sup>a</sup>	-0.01	1
Mean	1.79	1.55	1.81	1.59	1.15	1.28	1.33	1.61	36.25	37.48	0.48	0.10
Standard Deviation	0.64	0.64	0.61	0.67	0.42	0.54	0.55	0.67	12.74	10.57	0.50	0.30
Skewness	0.22	0.76	0.12	0.69	2.93	1.65	1.49	0.67	-0.10	-0.14	0.08	2.65
Kurtosis	-0.67	-0.47	-0.47	-0.61	8.21	2.10	1.26	-0.65	-0.38	1.29	-2.00	5.03

a:  $p < .001$ , b:  $p < .05$

[Table IV-4] One-way ANOVA by grades and achievement levels

	Grades			<i>F</i>	Achievement Levels		
	3 <sup>rd</sup> (N=471)	4 <sup>th</sup> (N=426)	5 <sup>th</sup> (N=508)		Average (N=760)	Low (N=635)	<i>F</i>
PD-R	1.72(0.44)	1.73(0.45)	1.62(0.42)	9.09 <sup>***</sup>	1.58(0.39)	1.82(0.45)	111.35 <sup>***</sup>
PD-R-1	1.80(0.66)	1.84(0.64)	1.74(0.42)	2.74	1.66(0.61)	1.96(0.65)	76.99 <sup>***</sup>
PD-R-2	1.59(0.68)	1.57(0.64)	1.49(0.60)	3.93 <sup>*</sup>	1.47(0.61)	1.65(0.68)	28.20 <sup>***</sup>
PD-R-3	1.81(0.64)	1.87(0.61)	1.77(0.58)	3.22 <sup>*</sup>	1.73(0.58)	1.91(0.63)	28.12 <sup>***</sup>
PD-R-4	1.66(0.69)	1.64(0.69)	1.49(0.62)	9.10 <sup>***</sup>	1.46(0.60)	1.76(0.71)	72.18 <sup>***</sup>
PD-A	1.37(0.43)	1.36(0.41)	1.28(0.33)	7.29 <sup>***</sup>	1.24(0.30)	1.45(0.45)	109.03 <sup>***</sup>
PD-A-1	1.19(0.45)	1.16(0.45)	1.10(0.34)	6.61 <sup>**</sup>	1.04(0.23)	1.27(0.54)	109.55 <sup>***</sup>
PD-A-2	1.36(0.61)	1.27(0.53)	1.21(0.46)	10.04 <sup>***</sup>	1.18(0.43)	1.40(0.6)	59.53 <sup>***</sup>
PD-A-3	1.38(0.59)	1.36(0.59)	1.25(0.47)	7.34 <sup>***</sup>	1.22(0.46)	1.46(0.63)	68.73 <sup>***</sup>
PD-A-4	1.61(0.70)	1.64(0.67)	1.58(0.65)	1.06	1.53(0.63)	1.70(0.71)	21.93 <sup>***</sup>
RA	36.02(10.17)	35.70(11.61)	38.61(10.69)	10.49 <sup>***</sup>	44.29(6.94)	27.65(6.60)	2084.80 <sup>***</sup>
vocabulary	36.14(11.20)	33.81(13.16)	38.40(13.37)	15.35 <sup>***</sup>	44.44(9.16)	26.13(8.13)	1534.54 <sup>***</sup>
reading comprehension	35.93(10.45)	37.59(11.40)	38.81(9.75)	9.22 <sup>***</sup>	44.14(7.61)	29.16(6.79)	1477.95 <sup>***</sup>
Covariates	–	–	–	–	–	–	–
child sex	0.50(0.50)	0.46(0.50)	0.47(0.50)	0.71	0.57(0.50)	0.37(0.48)	54.98 <sup>***</sup>
multicultural	0.18(0.38)	0.06(0.24)	0.06(0.24)	22.69 <sup>***</sup>	0.01(0.00)	0.02(0.14)	15.90 <sup>***</sup>

<sup>\*</sup>  $p < .05$ , <sup>\*\*</sup>  $p < .01$ , <sup>\*\*\*</sup>  $p < .001$

Furthermore, two sets of One-way ANOVA were performed in order to identify the statistical differences in means of subgroups (Table IV-4). The results of ANOVA by students' grades proposed that there were statistical differences in the means of PD-R, PD-A, and RA among different grades. To be specific, the fifth graders had significantly lower PDs and higher RA than the third and fourth graders. Thus, it can be concluded that students may form positive self-concepts in their academic abilities in accordance with improved reading skills. According to the results of ANOVA by students' achievement levels, there were also statistical differences in the means of all observed variables between low and average achievers. That is, students in a low achieving group showed higher levels of PDs and lower levels of RA than those in an average achieving group. Therefore, it is assumed that low achieving students had more negative PDs in their own academic performance in consistent with low achievements in vocabulary and reading comprehension, compared with average achieving students.

## 4.2. Mediation Effect Analysis

### 4.2.1. Confirmatory Factor Analysis

Before identifying the structural relationship among PD-R, PD-A, and RA, a confirmatory factor analysis (CFA) was conducted in order to confirm whether observed variables appropriately measure the latent variables. The model fit indices of CFA indicated that the observed variables successfully measured the latent variables ( $\chi^2 = 121.88$  [ $df$

= 32,  $p < .001$ ], CFI = 0.972, TLI = 0.961, RMSEA = 0.045). Discriminant validity was verified since standard estimates of all covariances between latent variables were below 0.85. Additionally, convergent validity was also confirmed, as all standard estimates were statistically significant ( $p < .001$ ) and were over 0.480, which demonstrates the stability of the CFA model (see Table IV-5).

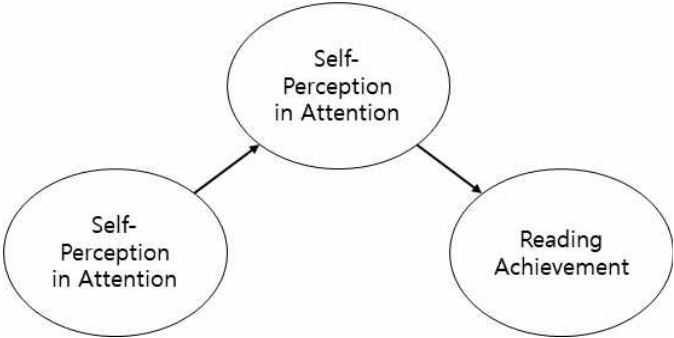
[Table IV-5] Estimates of a CFA model

Latent Variable	Observed Variable	Estimate	Standard Estimate	Standard Error	$p$ -value
PD-R	PD-R-1	0.857	0.554	0.057	0.000
	PD-R-2	0.743	0.480	0.056	0.000
	PD-R-3	0.721	0.492	0.052	0.000
	PD-R-4	1.000	0.621	–	–
PD-A	PD-A-1	0.707	0.588	0.044	0.000
	PD-A-2	0.938	0.604	0.059	0.000
	PD-A-3	1.000	0.626	–	–
	PD-A-4	0.937	0.483	0.067	0.000
RA	Voca	1.000	0.864	–	–
	RC	0.824	0.859	0.038	0.000
Covariances		Estimate	Standard Estimate	Standard Error	$p$ -value
PD-R	PD-A	0.120	0.831	0.009	0.000
PD-R	RA	-2.491	-0.543	0.209	0.000
PD-A	RA	-2.031	-0.530	0.173	0.000

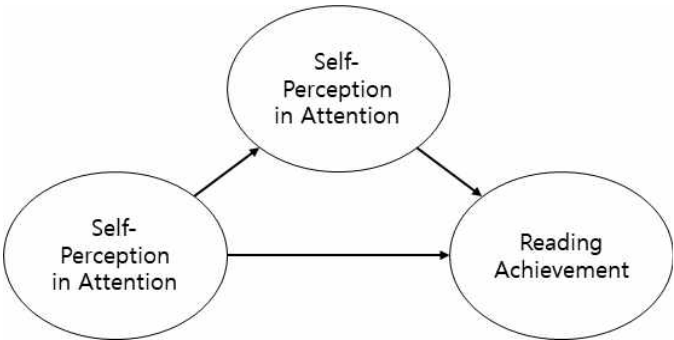
#### 4.2.2. Structural Equation Modeling (SEM) analysis

For the structural equation modeling (SEM) analysis, two competitive

models were set: direct and indirect mediation models. A direct mediation model (Figure IV-1) indicates that PD-R has a great impact on RA only through PD-A, and the direct effect of PD-R on RA may not be significant. However, since a indirect mediation model (Figure IV-2) allows the direct effect of PD-R on RA, PD-R can affect RA through two pathways.



[Figure IV-1] A direct mediation model



[Figure IV-2] An indirect mediation model

According to the result of SEM analyses, fit indices of both models were acceptable (Table IV-6). However, fit indices of the indirect model was more appropriate, since it had higher CFI and TLI, and lower RMSEA than the direct model. In addition, the result of a chi-squared difference test suggested that there is a significant

statistical difference between the two models ( $\Delta x^2 = 8.89$ ,  $\Delta df = 1$ ,  $p = 0.003$ ). Therefore, it was concluded that the indirect mediation model explained the data better than the direct mediation model.

[Table IV-6] Fit index of SEM models

Model	$x^2$	$df$	CFI	TLI	RMSEA
Direct	139.79***	47	0.972	0.961	0.037
Indirect	131.00***	46	0.974	0.964	0.036

\*\*\*  $p < .001$

Table IV-7 showed the results of SEM analysis on the indirect mediation model. After controlling child sex and multicultural background, there were statistically significant relationships among PD-R, PD-A, and RA. PD-R affected both PD-A ( $\beta = 0.83$ ,  $p < .001$ ) and RA ( $\beta = -0.31$ ,  $p < .002$ ). PD-A also significantly impacted RA ( $\beta = -0.26$ ,  $p < .007$ ).

[Table IV-7] Path coefficients of the indirect mediation model

		Estimate	Standard Estimate	Standard Error	$p$ -value
PD-R		-8.06	-0.31	2.58	0.002
PD-A	→ RA	-8.22	-0.26	3.06	0.007
Sex		4.19	0.19	0.57	0.000
Multicultural		-1.57	-0.04	0.94	0.095
PD-R		0.70	0.83	0.05	0.000
Sex	→ PD-A	0.00	0.00	0.02	0.989
Multicultural		0.03	0.03	0.04	0.326
Sex	→ PD-R	-0.06	-0.07	0.03	0.038
Multicultural		0.14	0.10	0.05	0.003



### 4.2.3. Bootstrap method

In order to identify the mediation effect of PD-A on the relationship between PD-R and RA, a bootstrap method (N=5,000) was conducted (Table IV-8). The indirect effect of PD-R on RA was statistically significant ( $\beta = -0.217$ ,  $p < .05$ ), and the 95% confidence interval did not include 0. Therefore, the mediating effect of PD-A was statistically demonstrated.

[Table IV-8] A mediation effect analysis

Path	Indirect	Direct	Total	95% Confidence Interval	
				Lower	Upper
PD-R $\rightarrow$ RA	-0.217*	-0.305***	-0.522*	-0.334	-0.100

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

## 4.3. Multi-Group Analysis

### 4.3.1. Multi-group analysis by grades

A multi-group analyses were performed to confirm whether the structural relationship among PD-R, PD-A, and RA is identical across the third to fifth graders (Table IV-9). The fit index of model 1 without any constraints showed the configural invariance among students with different grades ( $\chi^2 = 230.68$  [ $df = 138$ ,  $p < .001$ ], CFI = 0.972, TLI = 0.961, RMSEA = 0.038). For the next step, by comparing the fit index of model 1 and model 2 with constraints on every factor loading, metric invariance was also fulfilled since  $\Delta CFI$

was over  $-0.10$  and  $\Delta\text{RMSEA}$  was below  $0.015$  ( $\Delta\text{CFI} = -0.001$ ,  $\Delta\text{RMSEA} = 0.000$ ). Finally, by comparing model 2 and model 3 with constraints on every factor loading and path, scalar invariance was also confirmed ( $\Delta\text{CFI} = 0.003$ ,  $\Delta\text{RMSEA} = -0.001$ ). Therefore, it was concluded that the structural relationship among PD-R, PD-A, and RA was the same across the third to fifth grade students.

#### 4.3.2. Multi-group analysis by achievement levels

A multi-group analyses were conducted to identify whether the structural relationship among PD-R, PD-A, and RA is identical between average and low achievers (Table IV-9). The fit index of model 4 without any constraints showed the configural invariance among students with different achievement levels ( $\chi^2 = 178.41$  [ $df = 92$ ,  $p < .001$ ],  $\text{CFI} = 0.956$ ,  $\text{TLI} = 0.937$ ,  $\text{RMSEA} = 0.037$ ). For the next step, by comparing the fit index of model 4 and model 5 with constraints on every factor loading, metric invariance was not fulfilled since  $\Delta\text{CFI}$  was below  $-0.10$  ( $\Delta\text{CFI} = -0.025$ ,  $\Delta\text{RMSEA} = 0.007$ ). Thus, model 6 with constraints on all factor loadings except one (i.e., PD-A  $\rightarrow$  PD-A-1) was set in order to confirm partial metric invariance, instead of full metric invariance. By comparing model 4 with model 6, partial metric invariance was fulfilled ( $\Delta\text{CFI} = -0.006$ ,  $\Delta\text{RMSEA} = 0.001$ ). Finally, by comparing model 6 and model 7 additionally constraining all path coefficients, scalar invariance was also confirmed ( $\Delta\text{CFI} = -0.005$ ,  $\Delta\text{RMSEA} = 0.001$ ). Therefore, it can be assumed that the structural relationship among PD-R, PD-A, and RA was the same across low and average achieving students.

[Table IV-9] Factor invariance test

A multi-group analysis by grades							
	$x^2(df)$	CFI	TLI	RMSEA	Comp.	$\Delta$ CFI	$\Delta$ RMSEA
1. Configural invariance	230.68*** (138)	0.972	0.961	0.038	–	–	–
2. Metric invariance	254.47*** (152)	0.969	0.960	0.038	1	–0.001	0.000
3. Scalar invariance	257.07*** (158)	0.970	0.963	0.037	2	0.003	–0.001
A multi-group analysis by achievement levels							
	$x^2(df)$	CFI	TLI	RMSEA	Comp.	$\Delta$ CFI	$\Delta$ RMSEA
4. Configural invariance	178.41*** (92)	0.956	0.937	0.037	–	–	–
5. Metric invariance	230.21*** (99)	0.933	0.912	0.044	4	–0.025	0.007
6. Partial metric invariance	196.13*** (98)	0.950	0.933	0.038	4	–0.006	0.001
7. Scalar invariance	208.03*** (101)	0.945	0.929	0.039	6	–0.005	0.001

\*\*\*  $p < .001$

Comp. indicates the model compared to calculate  $\Delta$ CFI and  $\Delta$ RMSEA.

## CHAPTER 5. DISCUSSION

### 5.1. Summary of Results

The purpose of this study is to identify the mediating effect of perceived difficulties in reading (PD-R), perceived difficulties in attention (PD-A), and reading achievement (RA), and to confirm whether this structural relationship is varied in terms of students' grades and achievement levels. A summary of results retrieved from 1,405 elementary school third to fifth grade students in S city was as follows.

First, in order to solve the first research question, a confirmatory factor analysis (CFA), structural equation modeling (SEM) analysis, and bootstrap method were conducted. The result of CFA showed that observed variables successfully measured three latent variables included in this study: PD-R, PD-A, and RA. The SEM analysis and subsequently conducted ANOVA indicated that the model showing an indirect mediating effect of PD-R on the relationship between PD-A and RA explained the data better than the direct mediation model. The bootstrap method also corroborated the mediation effect of PD-R. Therefore, the prior assumption of the current study that PD-A mediates the effect of PD-R on RA was empirically demonstrated.

Second, to solve the second research question, a multi-group analysis by grades of each student were performed. Since it was demonstrated that the configural, metric, and scalar invariances were all fulfilled through the three-step analysis, there were no statistically

meaningful differences in the structural relationship across the third to fifth grade students.

Third, to solve the third research question, an additional set of multi-group analysis was conducted in terms of achievement levels of each participant. Through the three-step analysis method, it was also confirmed that the configural, partial metric, and scalar invariances were fulfilled. Thus, it was concluded that the structural relationship among PD-R, PD-A, and RA had no statistical differences between low and average achieving students.

## 5.2. General Discussions

The present study can suggest following discussions including the implications for educational research and practice. First, it was found that self-perceived difficulties in academic tasks are also important risk factors that may affect the performance of each student. Although academic self-perceptions can be categorized into three sub-components, including perceptions of competence, perceptions of difficulty, and academic attitudes (Chapman & Tunmer, 1995), the perceived difficulties during the academic tasks have been less likely to be measured and investigated, compared to academic self-efficacy (e.g., Carroll & Fox, 2017; Peura et al., 2019; Schunk, 2003) or academic motivations (e.g., Kanuika, 2010; Katzir, Lesaux, & Kim, 2009; Malanchini et al., 2017). Through the current study, the standard estimate of covariance between self-perceived difficulties in reading and actual reading performance was  $-0.543$ , and the standard estimate of path coefficient from self-perceived difficulties in reading

to reading achievement was  $-0.31$ . That is, self-perceived difficulties in reading can predict the individual difference in reading performance. This result supports the discussions from the prior study that the path coefficient from self-perception to achievement gets stronger in domains where people perceive more difficult than others (Schober et al., 2018; Valentine et al., 2004).

The Self-Enhancement Model is also consistent with the framework of the current study. Students who have negative associations with reading and perceive reading as a difficult task are more likely to avoid, be disengaged in, and uncommitted to reading-related activities (Alvermann, 2008; Strahan, 2008), which may lead to more significant reading difficulties in the future (Spaulding, 1992). That is, effortful engagement can mediate the effect of a high level of perceived difficulty in reading on subsequent reading performance. Therefore, along with the educational practice to leverage reading achievement itself, efforts to lower the perceived difficulties of students in order to let them more engaged in reading activities. Based on the Complex Effects Model (CEM), positive self-perception in reading which is an integral part of a “reader” element are highly associated with text, activity, and context (RRSG, 2002). To be specific, teachers should provide text with a moderate level of difficulty not overwhelming each student, plan concrete activities to alleviate reading anxiety, and manage classroom dynamics to make students form more positive attitude toward books.

Second, this study focused not only on the perceived difficulties in reading (PD-R) but also on the perceived difficulties in attention (PD-A) which was often ignored in reading-related research. PD-A is conceptualized as an awareness or perceived difficulty in one’s own attention, encompassing the perception of one’s

own attention state (Wu, 2017). The result explicitly indicated that PD-A can predict RA of elementary school students. Specifically, the standard estimate of the covariance between PD-A and RA was turned out to be -0.530, which was almost the same as that between PD-R and RA (-0.543). The standard estimate of the path coefficient from PD-A to RA was -0.26, which was also similar with that from PD-R (-0.31). That is, PD-A can predict the variance of RA with the similar level of explanatory power with PD-R.

In accordance with the fact that sustained attention has been a primary predictor of reading comprehension (Flory et al., 2006; Silva-Pereyra et al., 2010; Smallwood, McSpadden, & Schooler, 2008), PD-A had a significant impact on RA as well. Loper and Hallahan (1982) detected statistically significant relationship between PD-A and achievement, and Loper, Hallahan, and Ianna (1982) stated that high PD-A of students with learning disabilities led them to low academic performances. Thus, it is important for educators to have interests in students' perceived difficulties in attention as well as those in reading and provide educational intervention to relieve negative impact of self-perceived difficulties in attention.

Third, the mediating effect of PD-A on the relationship between PD-R and RA was revealed. That is, the effect of PD-R on PD-A was additionally demonstrated. The standard estimate of the covariance between PD-R and PD-A was turned out to be extremely high (0.830), which is the same as the standard estimate of the path coefficient from PD-R to PD-A. Since PD-R can predict the variance of PD-A, increase in perceived difficulties in attention can be followed by the increase in perceived difficulties in reading. This result is aligned with Webster et al. (2021) that difficulties in reading and attention can be correlated, and Chapman et al. (2000) that PD-R

can be generalized to PD in academic abilities in general, including self-perceived attention. Therefore, it can be assumed that reading is the most important skill that forms academic self-concept of elementary school students and that high PD-R can also harm PDs in other academic domains. Through prior studies, it was discovered that PD-R becomes static after the fourth grade (Carroll & Fox, 2017; Katzir, Lesaux, & Kim, 2009), whereas PD-A can be variable after the fifth grade (Loper & Hallahan, 1982). This rationale which is consistent with what the current study discovered can lead to a conclusion that PD-R formed before the fourth grade can be generalized into PD-A after the fifth grade. Hence, it is necessary to lower children's PD-R as early as possible before entering the fourth stage of Chall's reading developmental trajectory, and prevent the negative impact of PD-R on PD in other kinds of academic abilities such as PD-A.

The indirect effect from PD-R to RA mediated by PD-A was -0.217, which was not as significant as the direct effect but still considerable. Since a considerable amount of variances of RA can be explained through PD-A, and PD-A is more malleable than PD-R (Loper & Hallahan, 1982), educators need to focus on the effect of PD-A on RA when planning to improve students' reading performance. In order to lower PD-A, students need to explicitly learn strategies to monitor their attention, which might be different from learning specific skills. According to Kirby (1988), skills are automatic procedures, product-oriented, observable behaviors, and able to be improved by repeated practice, whereas strategy is a conscious plan under one's control, process-oriented, unobservable operations, and able to be enhanced through reasoning process. Most reading interventions have focused on the instruction on specific reading



skills, rather than monitoring the use of strategies during reading (Kim, 2010). Therefore, educators need to be well-aware of concrete instructional methods to teach students strategies to monitor attention and decrease PD-A in the long run.

Referencing four social cognitive factors proposed by Bandura (1977), teachers can implement strategies including (1) self-awareness of personal progress, (2) observational comparison, (3) agreeable social feedback, and (4) positive physiological state. For example, in order to improve the self-awareness of personal progress, teachers should show let students know and understand their progress in sustained attention with objective student performance data. To use the observational comparison strategy, peers' sustained attention data can be utilized, but not in a negative way such as overwhelming students with a lower level of attention by comparing them with high achieving peers. Teachers can give positive social feedback directly to their students, which can be a positive reinforcement to form positive self-perception in attention and make more effortful engagement. However, during the social persuasion, it is important to give realistic feedback that students can believe and internalize. Lastly, educators also keep focusing on what students feels during the attention-related tasks. If the students feel physiologically uncomfortable during the assigned tasks, they may be more reluctant to sustain their attention in the future. Thus, it is highly necessary for teachers to modify and find the optimal classroom environment for students' convenience.

Fourth, the structural relationship among PD-R, PD-A, and RA was stable across different grades. That is, the effect of PD-R on RA, PD-R on PD-A, and PD-A on RA is already fixed even when a student is in the third grade. This result is in line with a study that found no evidence for considerable grade-level differences

in the relationship between PD and RA between students in Grade 4, 7, and 10 (Shell et al., 1995). However, across several empirical studies, it was proved that the relationship between PD and RA changes with age (Huang, 2011). To be specific, Carroll and Fox (2017) revealed that self-perception was positively related to fluency but not to reading comprehension, among 8- to 11-year-old children. However, among the fifth and seventh grade students, a positive association between self-perception and both reading fluency and comprehension was found (Ho & Guthrie, 2013; Mercer et al., 2011). Katzir, Lesaux, and Kim (2009) similarly corroborated the positive correlation between self-perception and reading comprehension skills after controlling verbal and word reading skills of the fourth graders. The aforementioned change in the PD-RA relationship is mainly due to the difference in measured sub-skills of RA. RA can be categorized into two sub-skills: decoding skills and comprehension skills (Bos & Vaughn, 2002). Decoding skills are usually developed earlier than comprehension skills, and this is why self-perception and reading fluency are more strongly related during the lower elementary school years, whereas self-perception and reading comprehension are stronger during the upper elementary school years. Therefore, the stability of PD-RA relationship derived from the current study was consistent with the prior empirical studies, since this study focused on vocabulary and reading comprehension skills for measuring RA.

The third to five grades are important in that students' purpose of reading is replaced from "learning to read" to "reading to learn (Beaudette et al., 2017; Chall, 1996; Duke, 2019)." According to a reading developmental model suggested by Chall (1996), readers in grades 2-3 consolidate their decoding skills, build their sight word vocabularies, and increase their reading fluency. In grades 4-8,

readers are marked by a pronounced shift corresponding shift in the classroom from an emphasis on narrative stories to expository passages as the subject of reading becomes more integrated into content area reading. If children in this phase developed high PD in their reading, it could be generalized to PD in attention and contribute to a low performance in RA. Therefore, educators teaching 3-5 graders literacy and language art should develop effective strategies to improve students' vocabulary and reading comprehension skills accompanied by low levels of perceived difficulties with reading and attention.

For example, questioning strategies are often used to enhance students' reading comprehension skills, by activating prior knowledge, summarizing main idea, self-monitoring their understanding (Mastropieri, Scruggs, & Butcher, 1997). It is also important to note that this questioning strategy also lead students to concentrate on the text (Kim, Lee, & Shin, 2016), which can affect PD-A in the long run. Hence, teachers can expect students to improve both PD-R and PD-A leveraging RA by using this strategy into reading intervention.

Kim (2010) also developed an intervention program to instruct strategies of monitoring students' own attention process. It includes three lessons with 40 minute duration for each: (1) facilitating attention, (2) visual attention, and (3) auditory attention. During the first session, students explicitly learn self-affirmation and self-assessment strategies during reading activities. During the second and third sessions, teachers give students abundant opportunities to use attention-monitoring strategies mastered in the first session. Through the learning activities, students are able to be well-aware of their current and improved state of attention. As this program also emphasizes the linkage between strategies and school

curriculum, students are expected to apply these strategies at classroom even after the program is terminated and to ultimately improve their overall academic skills in the long run.

Lastly, the structural relationship among PD-R, PD-A, and RA was also stable between average and low achieving students. Students who were lower than 15<sup>th</sup> percentile in both standardized vocabulary and reading comprehension assessments did not show different coefficients from those who were higher than 15<sup>th</sup> percentile in vocabulary or reading comprehension skills. This result demonstrates that low achieving students had more negative self-perceptions in consistent with their low RA. What began as weaknesses in reading skills or negative associations toward reading develops into a downward spiral of achievement deficits and negative motivational spinoffs (Prochnow, Tunmer, & Chapman, 2013). Thus, it is important for educators to screen low achieving readers as early as possible and protect them from the negative Matthew effect (Stanovich, 1986).

There have been some studies with contrasting view that PD-RA relationship of low achievers is somewhat different than that of average achievers. According to the self-protection hypothesis, low achieving readers show weaker PD-RA relationship than average skilled readers (Heath & Brown, 1999), since they are more likely to protect themselves from negative emotional outcomes derived from academic failure (Heath & Glen, 2005). This hypothesis posed an interesting explanation that overestimating inclination in academic self-perception contributes to sustaining low reading capacities, as they do not slack off in their efforts (Linderholm et al., 2008). On the other hand, recent studies have corroborated that PD-RA relationship of less skilled readers are stronger than others. For instance, it was

found that the correlation between RA and self-perception in reading, writing, and spelling was stronger in low achievers by conducting a meta-analysis (McArthur et al., 2020). In addition, another study found that the relationship between former PD-R and later RA was the strongest for low achieving students even after controlling demographic components and former RA (Susperreguy et al., 2018).

However, as the current study proved the same effect of PD on RA between average and low achieving students, it can be assumed that self-reported difficulties with reading and attention can successfully reflect actual RA of each student. According to a Response-to-Intervention model for deciding eligibility of learning disabilities, a universal screening procedure to identify students at-risk for learning disabilities need to be conducted at least three times a year (Kim, Lee, & Shin, 2016). Despite the necessity of universal screening, it is often regarded costly and time-consuming to perform standardized academic assessments to all students at school. As self-perceived difficulties in reading and attention are able to predict actual reading performance, teachers are recommended to use self-reported surveys which are far more convenient and cost-effective (Kim, Kim, & Lee, 2012).

For example, teachers can let their students submit LDST which was used to assess PD in the present study at the beginning of every semester, so as to screen low achieving students who are in danger of the negative Matthew effect. After the initial screening procedure, students at risk for learning disabilities can additionally conduct standardized academic skills assessments (e.g., Basic Academic Skills Assessment; BASA; Kim, 2000) under the guidance of their teachers, to confirm whether students' actual performances are in consistent with their self-report of difficulties.

### 5.3. Limitations and Future Research

Although the proposed results from the current study can suggest significant implications for future educational practice, there were also some limitations that readers should be aware of in advance. First, this study did not propose any information about the antecedents of PD-R and PD-A. Although it was discovered that progress, observational comparison, social feedback, and physiological state are the social cognitive factors influencing PDs (Bandura, 1977), the current study could not specify any possible personal or environmental variables affecting PDs through observed data. The future research thus should work on deciding predictors of PDs by collecting more relevant data.

Second, the structural model that PD-A mediates the effect of PD-R on RA was set based on theories and former empirical studies, but it is still limited to interpret this result as a causal relationship. If the current study had been designed to collect longitudinal data, the causation might have been more clear. Thus, future research need to collect students' data at least three times to demonstrate former PD-R have an effect on later PD-A, and former PD-A have an impact on the latest RA. In addition, as the skill development model which is in opposition to self-enhancement model is also widely supported by previous empirical studies (e.g., Aunola et al., 2002; Morgan et al., 2008; Ruddel & Unrau, 2004), confirming the longitudinal relationship among PD-R, PD-A, and RA by using an autoregressive cross-lagged modeling is recommended. For example, PD-R at time 1 can affect PD-A at time 2 and this PD-A can consequently affect RA at time 3. At the same time, it is also possible that RA at time 1 can have impact on PD-R at time 2 and

PD-A at time 3. Confirming these longitudinal relationships would enhance the understanding of affective basis of reading.

Third, among the sample used in this study, the proportion of students classified as low achievers were extremely high (45.2%). This was mainly because the sample was collected from the city where a lack of student educational support was pervasive. Although the current study controlled whether the students were from multi-cultural family by inserting covariates into the SEM model, it is still possible that educational support surrounding students can have great impact on PD, RA, and PD-RA relationship. Therefore, future studies need to investigate the identical structural relationship for students in other regions where the proportion of low achievers are marginal in order to generalize the current results.

Lastly, the present study focused on comprehension skills (e.g., vocabulary and reading comprehension) for assessing students' actual RA, since 3-5 graders were collected as a sample. However, it is also important to note that the relationship between PD and decoding might be different from that between PD and comprehension, and this relationship can also be varied across students' age. For example, Carroll and Fox (2017) stated that self-perception in reading was positively associated with reading fluency which is a core component of decoding, but not with reading comprehension among 8-11-year old children. It is thus suggested that the structural relationship among PD-R, PD-A, and RA should be reviewed according to different types of reading abilities and children with different ages.

## Bibliography

- Aaron, P. G., Josh, M., Ayotollah, M., Ellsberry, A., Henderson, J., & Lindsey, K. (1999). Decoding and sight-word naming: Are they independent components of word recognition skill? *Reading and Writing: An Interdisciplinary Journal*, 11, 89-127.
- Alvermann, D. (2008). Why bother theorizing adolescents' online literacies for classroom practice and research? *Journal of Adolescent & Adult Literacy*, 52(1), 8 - 19.
- Anderson, J. C., & Gerbing, D. W. (1998). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103(3), 411.
- Assor, A., & Connell, J. P. (1992). The validity of students' self-reports as measures of performance affecting self-appraisals. In D. H. Schunk & J. L. Meece (Eds.), *Student perceptions in the classroom*. Hillsdale, NJ: Erlbaum.
- Aunola, K., Leskinen, E., Onatsu-Arvilommi, T., & Nurmi, J. E. (2002). Three methods for studying developmental change: A case of reading skills and self-concept. *British Journal of Educational Psychology*, 72, 343 - 364.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Barber, A. T., Cartwright, K. B., Stapleton, L. M., Klauda, S. L., & Archer, C. J., & Smith, P. (2020). Direct and indirect effects of



- executive functions, reading engagement, and higher order strategic processes in the reading comprehension of Dual Language Learners and English Monolinguals. *Contemporary Educational Psychology*, 61, 101848.
- Beaudette P., Chalasani K., & Rauschenberg S. (2017). *How Do Students' 3rd Grade Reading Levels Relate to their ACT/SAT Performance and Chance of Graduating from High School?* Atlanta, GA: Governor's Office of Student Achievement. Available at: <http://www.gosa.georgia.gov/document/publication/how-do-students-3rd-grade-reading-levels-relate-their-actsat-performance-and/download>. Accessed April 4, 2022.
- Blumenfeld, P. C., Pintrich, P. R., Meece, J., & Wessels, K. (1982). The formation and role of self-perceptions of ability in elementary classrooms. *The Elementary School Journal*, 82(5), 400-420.
- Bong, M., & Skaalvik, E. M. (2003). Academic self-concept and self-efficacy: How different are they really? *Educational Psychology Review*, 15, 1-40.
- Bos, C. S., & Vaughn, S. (2002). *Strategies for teaching students with learning and behavior problems* (5th ed.). Boston, MA: Allyn & Bacon.
- Bosse, M., & Valdois, S. (2009). Influence of the visual attention span on child reading performance: A cross-sectional study. *Journal of Research in Reading*, 32, 230 - 253.
- Burek, B., & Martinussen, R. (2020). The relationship between behavioral inattention, meta-attention, and graduate students' online information seeking. *Mind, Brain, and Education*, 15(1), 111-121.

- Byren, B. M., Shavelson, R. J., & Muthen, B. (1989). Testing for the equivalence of factor covariance and mean structures: The issue of partial measurement invariance. *Psychological Bulletin*, 105, 456-466.
- Cain, K. (2003). Text comprehension and its relation to coherence and cohesion in children's fictional narrative. *British Journal of Developmental Psychology*, 21, 335-351.
- Calsyn, R. J., & Kenny, D. A. (1977). Self-concept of ability and perceived evaluation of others: Cause or effect of academic achievement? *Journal of Educational Psychology*, 69, 136-145.
- Carroll, J. M., & Fox, A. C. (2017). Reading self-efficacy predicts word reading but not comprehension in both girls and boys. *Frontiers in Psychology*, 7. <https://doi.org/10.3389/fpsyg.2016.02056>.
- Catts, H. W., Hogan, T. P., & Fey, M. E. (2003). Subgrouping poor readers on the basis of individual differences in reading-related abilities. *Journal of Learning Disabilities*, 36(3), 151-164.
- Chall, J. S. (1996). *Stages of Reading Development* (2nd ed.). Fort Worth: Harcourt Brace College Publishers.
- Chapman, J. W., & Tunmer, W. E. (1995). Development of young children's reading self-concepts: An examination of emerging subcomponents and their relationship with reading achievement. *Journal of Educational Psychology*, 87(1), 154-167.
- Chapman, J. W., & Tunmer, W. E. (1997). A longitudinal study of beginning reading achievement and reading self-concept. *British Journal of Educational Psychology*, 67, 279-291.
- Chapman, J. W., & Tunmer, W. E. (2003). Reading difficulties,

- reading-related self-perceptions, and strategies for overcoming negative self-beliefs. *Reading and Writing Quarterly*, 19(1), 5-24.
- Chapman, J. W., Tunmer, W. E., & Prochnow, J. E. (2000). Early reading-related skills and performance, reading self-concept, and the development of academic self-concept: A longitudinal study. *Journal of Educational Psychology*, 92, 703 - 708.
- Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, 14(3), 464-504.
- Cromley, J. G., & Azevedo, R. (2007). Testing and refining the direct and inferential mediation model of reading comprehension. *Journal of Educational Psychology*, 99, 311-325.
- Cromley, J. G., Snyder-Hogan, L. E., & Luciw-Dubas, U. A. (2010). Reading comprehension of scientific text: A domain-specific test of the direct and inferential mediation model of reading comprehension. *Journal of Educational Psychology*, 102(3), 687-700.
- Cunningham, A. E., & Stanovich, K. E. (1991). Tracking the unique effects of print exposure in children: Associations with vocabulary, general knowledge, and spelling. *Journal of Educational Psychology*, 83(2), 264-274.
- Deacon, S. H., Cook, K., & Parrila, R. (2012). Identifying high-functioning dyslexics: is self-report of early reading problems enough? *Annals of Dyslexia*, 62, 120-134.
- Duke, N. K. (2019). Reading by third grade: How policymakers can foster early literacy. *State Education Standard*, 19(2), 6-11.
- Dunning, D., Heath, C., & Suls, J. M. (2004). Flawed self-assessment: Implications for health, education, and the workplace.

- Psychological Science in the Public Interest*, 5(3), 69–106.
- Efklides, A. (2006). Metacognition and affect: What can metacognitive experiences tell us about the learning process. *Educational Research Review*, 1(1), 3–14.
- Ehri, L. C. (1995). Phases of development in learning to read words by sight. *Journal of Research in Reading*, 18(2), 116–125.
- Enders, C. K., & Bandalos, D. L. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling*, 8, 430–457.
- Flory, K., Milich, R., Lorach, E. P., Hayden, A. N., Strange, C., & Welsh, R. (2006). Online story comprehension among children with ADHD: Which core deficits are involved? *Journal of Abnormal Child Psychology*, 34, 853 – 865.
- Forster, N., & Souvignier, E. (2014). Learning progress assessment and goal setting: Effects on reading achievement, reading motivation and reading self-concept. *Learning and Instruction*, 32, 91–100.
- Forsterling, F., & Morgenstern, M. (2002). Accuracy of self-assessment and task performance: Does it pay to know the truth? *Journal of Educational Psychology*, 94(3), 576–585.
- Frith, U., & Snowling, M. (1983). Reading for meaning and reading for sound in autistic and dyslexic children. *British Journal of Developmental Psychology*, 1, 320–342.
- Galla, B. M., Wood, J. J., Tsukayama, E., Har, K., Chiu, A. W., & Langer, D. A. (2014). A longitudinal multilevel model analysis of the within-person and between-person effect of effortful engagement and academic self-efficacy on academic performance. *Journal of School Psychology*, 52(3), 295 – 308.

- Girli, A., & Ozturk, H. (2017). Metacognitive reading strategies in learning disability: Relations between usage level, academic self-efficacy and self-concept. *International Electronic Journal of Elementary Education*, 10(1), 93-102.
- Gough, P., & Tunmer, W. (1986). Decoding, reading, and reading disability. *Remedial and Special Education*, 7(2), 6-10.
- Hartas, D., & Warner, B. J. (2000). *The Literacy Dictionary: The Vocabulary of Reading and Writing*. Newark, DE: International Reading Association.
- Harter, S. (1986). Cognitive-developmental processes in the integration of concepts about emotions and the self. *Social Cognition*, 4, 119-151.
- Hay, I., Ashman, A. F., & Van Kraayenoord, C. E. (1998). Educational characteristics of students with high or low self-concept. *Psychology in the Schools*, 35(4), 391-400.
- Heath, N. L., & Brown, A. E. (1999). Self-concept differentiation and depressive symptomatology in children, *International Journal of Psychology*, 34(2), 95-105.
- Heath, N. L., & Glen, T. (2005). Positive illusory bias and the self-protective hypothesis in children with learning disabilities. *Journal of Clinical Child and Adolescent Psychology*, 34(2), 272-281.
- Henk, W. A., & Melnick, S. A. (1995). The Reader Self-Perception Scale (RSPS): A new tool for measuring how children feel about themselves as readers. *The Reading Teacher*, 48(6), 470-482.
- Hentges, R. F., Graham, S. A., Plamondon, A., Tough, S., & Madigan, S. (2019). A developmental cascade from prenatal stress to child internalizing and externalizing problems. *Journal of*

- Pediatric Psychology*, 44(9), 1057-1067.
- Heyman, W. B. (1990). The self-perception of a learning disability and its relationship to academic self-concept and self-esteem. *Journal of Learning Disabilities*, 23(8), 472-475.
- Ho, A. N., & Guthrie, J. T. (2013). Patterns of association among multiple motivations and aspects of achievement in reading. *Reading Psychology*, 34(2), 101 - 147.
- Hoover, W. A., & Gough, P. B. (1990). The simple view of reading. *Reading and Writing: An Interdisciplinary Journal*, 2, 127-160.
- Huang, C. (2011). Self-concept and academic achievement: A meta-analysis of longitudinal relations. *Journal of School Psychology*, 49, 505-528.
- Hurtford, D. P., Schauf, J. D., Bunce, L., Blaich, T., & Moore, K. (1994). Early identification of children at risk for reading disabilities. *Journal of Learning Disabilities*, 27, 371-382.
- Jackson, D. L., Gillaspay, J. A., Jr., & Purc-Stephenson, R. (2009). Reporting practices in confirmatory factor analyses: AN overview and some recommendations. *Psychological Methods*, 14(1), 6-23.
- Joshi, R. M., Williams, K., & Wood, J. (1998). Predicting reading comprehension from listening comprehension: Is this the answer to the IQ debate? In C. Hulme & R. M. Josh (Eds.), *Reading and Spelling: Development and Disorders* (pp. 319-327). Manhawah, NJ: Lawrence Erlbaum.
- Kanuika, T. S. (2010). Reading achievement, attitude toward reading, and reading self-esteem of historically low achieving students. *Journal of Instructional Psychology*, 37(2), 184-188.
- Kaplan, D. (2008). *Structural Equation Modeling: Foundations and*

*Extensions*. New York, NY: SAGE.

- Katzir, T., Lesaux, N. K., & Kim, Y.-S. (2009). The role of reading self-concept and home literacy practices in fourth grade reading comprehension. *Reading & Writing, 22*, 261-276.
- Kim, D. I. (2000). *Basic Academic Skills Assessment: Reading*. Seoul: Hakjisa.
- Kim, D. I. (2010). *A Learning Strategy Program for Attention*. Seoul: Hakjisa.
- Kim, D. I. (2012). *Learning Disabilities Screening Test*. Seoul: Hakjisa.
- Kim, D. I. (2019a). *Basic Academic Skills Assessment: Vocabulary*. Seoul: Inpsyt.
- Kim, D. I. (2019b). *Basic Academic Skills Assessment: Reading Comprehension*. Seoul: Inpsyt.
- Kim, D. I., Choi, J. K. (2004). Current practices and prospects for early literacy skill test to screen children with learning difficulties. *Korean Journal of Educational Research, 42*(3), 275-299.
- Kim, D. I., An, Y., Kim, H., & Shin, H.G. (2018). An analysis of the vocabulary acquisition and reading comprehension skills of reading achievement levels. *The Journal of Learner-Centered Curriculum and Instruction, 18*(13), 505-522.
- Kim, D. I., An, Y., Lee, M., Cho, Y. H., Park, S. Y., & Koh, H. J. (2016a). A validation study on Basic Academic Skills Assessment (BASA): Vocabulary. *The Journal of Special Children Education, 18*(3), 55-76.
- Kim, D. I., An, Y., Hwang, J. Y., Park, S. Y., & Kim, B. N. (2016b). A fundamental study for developing curriculum based measurement on vocabulary: Selection of educational

- vocabulary for 4-6th graders. *The Korea Journal of Learning Disabilities*, 13(3), 1-18.
- Kim, D. I., Kim, D. M., & Lee, K. J. (2012). Validation of the screening checklist for students with learning difficulties. *Asian Journal of Education*, 13(1), 47-71.
- Kim, D. I., Kim, H. J., Shin, G. H. Y., Jang, S., Ahn, S. J., & Lim, H. J. (2017). A validation study on Basic Academic Skills Assessment (BASA): Reading Comprehension. *Korean Journal of Learning Disabilities*, 14(2), 1-20.
- Kim, D. I., Lee, D. S., & Shin, J. H. (2016). *Introduction to Learning Disabilities* (3rd ed.). Seoul: Hakjisa.
- Kim, D. I., & Lim, J. H. (2020). The mediating effect of mental health problems on correlation between self-concept and school adjustment of adolescents: Multi-group analysis between low achievers and students without disabilities. *Korean Journal of Learning Disabilities*, 17(3), 107-128.
- Kim, D. I., & Lim, J. H. (2021). The effect of home and school environment on self-concept type of middle school low achievers. *The SNU Journal of Education Research*, 30(1), 1-24.
- Kirby, J. R. (1988). Style, strategy, and skill in reading. In R. R. Schmeck (Ed.), *Learning Strategies and Learning Styles*. New York, NY: Plenum, pp. 3-19.
- Kline, R. B. (2010). *Principles and practice of structural equation modeling* (3rd ed.). New York: Guilford Press.
- Kline, R. B. (2011). Convergence of structural equation modeling and multilevel modeling. In M. Williams (Ed.), *Handbook of methodological innovation*. Thousand Oaks, CA: Sage.
- Kurtz-Costes, B. E., & Schneider, W. (1994). Self-concept,



- attributional beliefs, and school achievement: A longitudinal analysis. *Contemporary Educational Psychology*, 19, 199–216.
- Kush, J. C., Watkins, M. W., & Brookhart, S. M. (2005). The temporal-interactive influence of reading achievement and reading attitude. *Educational Research and Evaluation*, 11(1), 29–44.
- Kwon, H., & Linderholm, T. (2014). Effects of self-perception of reading skill on absolute accuracy of metacomprehension judgement. *Current Psychology*, 33, 73–88.
- Linderholm, T., Cong, X., & Zhao, Q. (2008). Differences in low and high working-memory capacity readers' cognitive and metacognitive processing patterns as a function of reading for different purposes. *Reading Psychology*, 29(1), 61–85.
- Linnenbrink, E. A., & Pintrich, P. R. (2003). The role of self-efficacy beliefs in student engagement and learning in the classroom. *Reading & Writing Quarterly*, 19(2), 119–137.
- Little, R. J. (1998). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, 83, 1198–1202.
- Loper, A. B., & Hallahan, D. P. (1982). Meta-attention: The development of awareness of the attentional process. *The Journal of General Psychology*, 106, 27–33.
- Loper, A. B., Hallahan, D. P., & Ianna, S. O. (1982). Meta-attention in learning disabled and normal students. *Learning Disability Quarterly*, 5(1), 29–36.
- Malanchini, M., Wang, Z., Voronin, I., Schenker, V. J., Plomin, R., & Petrill, S. A. (2017). Reading self-perceived ability, enjoyment and achievement: A genetically informative study of their reciprocal links over time. *Developmental Psychology*, 53(4),

698-712.

- Marsh, H. W., Craven, R. G., & Debus, R. (1991). Self-concepts of young children 5 to 8 years of age: measurement and multidimensional structure. *Journal of Educational Psychology*, 83(3), 377-392.
- Marshall, H. H., & Weinstein, R. S. (1984). Classroom factors affecting students' self-evaluation: An interactional model. *Review of Educational Research*, 54, 301-325.
- Mastropieri, M. A., & Scruggs, T. E., & Butcher, K. (1997). How effective is inquiry learning for students with mild disabilities? *The Journal of Special Education*, 31(2), 199-211.
- McArthur, G. M., Filardi, N., Francis, D. A., Boyes, M. E., & Bacock, N. A. (2020). Self-concept in poor readers: A systematic review and meta-analysis. *Peer J*, 8, e8772.
- Mercer, S. H., Nellis, L. M., Martinez, R. S., & Kirk, M. (2011). Supporting the students most in need: Academic self-efficacy and perceived teacher support in relation to within-year academic growth. *Journal of School Psychology*, 49(3), 323-338.
- Meredith, W. (1993). Measurement invariance, factor analysis, and factorial invariance. *Psychometrika*, 58, 525-542.
- Mills, C., D'Mello, S. K., & Kopp, K. (2015). The influence of consequence value and text difficulty on affect, attention, and learning while reading instructional texts. *Learning and Instruction*, 40, 9-20.
- Millsap, R. E., & Olivera-Aguilar, M. (2012). Investigating measurement invariance using confirmatory factor analysis. In R. H. Hoyle (Ed.), *Handbook of structural equation modeling* (pp. 380-392). New York: Guilford.

- Morgan, P. L., Fuchs, D., Compton, D. L., Cordray, D. S., & Fuchs, L. S. (2008). Does early reading failure decrease children's reading motivation? *Journal of Learning Disabilities, 41*(5), 387-404.
- Nation, K., & Snowling, M. J. (1997). Assessing reading difficulties: The validity and utility of current measures of reading skill. *British Journal of Educational Psychology, 67*, 359-370.
- Nunally, J. (1978). *Psychometric Theory* (2nd ed.). New York, NY: MacGraw-Hill.
- Oakhill, J., & Yuill, N. (1996). Higher order factors in comprehension disability: Processes and remediation. In C. Cornoldi & J. V. Oakhill (Eds.), *Reading Comprehension Difficulties: Processes and Intervention* (pp. 69-92). Mahwah, NJ: Erlbaum.
- Ormrod, J. E. (1990). *Human learning: Theories, principles, and educational applications*. New York, NY: Macmillan.
- Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research, 66*, 543-578.
- Paris, S. G., & Cunningham, A. E. (1996). Children becoming students. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology* (pp. 117-147). New York: Macmillan.
- Parker, P. D., Marsh, H. W., Ciarrochi, J., Marshall, S., & Abduljabbar, A. S. (2014). Juxtaposing math self-efficacy and self-concept as predictors of long-term achievement outcomes. *Educational Psychology, 34*, 29 - 48.
- Pashler, H. (1998). *The Psychology of Attention*. Cambridge, MA: MIT Press.
- Peterson, S. E., & Posner, M. I. (2012). The attention system of the human brain: 20 years after. *Annual Review of Neuroscience, 35*(1), 73-89.

- Petscher, Y., & Logan, J. A. R. (2014). Quantile regression in the study of developmental sciences. *Child Development, 85*, 861–881.
- Peura, P., Aro, T., Viholainen, H., Raikkonen, E., Usher, E. L., Sorvo, R., & Aro, M. (2019). Reading self-efficacy and reading fluency development among primary school children: Does specificity of self-efficacy matter? *Learning and Individual Differences, 73*, 67–78.
- Peura, P., Aro, T., Raikkonen, E., Viholainen, H., Koponen, T., Usher, E. L., & Aro, M. (2021). Trajectories of change in reading self-efficacy: A longitudinal analysis of self-efficacy and its sources. *Contemporary Educational Psychology, 64*, 101947.
- Prochnow, J. E., Tunmer, W. E., & Chapman, J. W. (2013). A longitudinal investigation of the influence of literacy-related skills, reading self-perceptions, and inattentive behaviours on the development of literacy learning difficulties. *International Journal of Disability, Development, and Education, 60*(3), 185–207.
- RAND Reading Study Group. (2002). Reading for understanding: Toward an R&D program in reading comprehension. Santa Monica, CA: RAND Corporation. Retrieved from [https://www.rand.org/pubs/monograph\\_reports/MR1465.html](https://www.rand.org/pubs/monograph_reports/MR1465.html).
- Reisberg, D., & McLean, J. (1985). Meta-attention: Do we know when we are being distracted? *The Journal of General Psychology, 112*(3), 291–306.
- Renninger, A., & Hidi, S. (2016). *The power of interest for motivation and engagement*. New York, NY: Taylor & Francis, Routledge.
- Rider, N., & Colmar, S. (2006). Reading achievement and reading

- self-concept in year 3 students. In P. L. Jeffery (Ed.), *AARE 2005 International Education Research Conference*. Creative dissent: Constructive solutions. Melbourne: AARE.
- Rothman, H. R., & Cosden, M. (1995). The relationship between self-perception of a learning disability and achievement, self-concept and social support. *Learning Disability Quarterly*, 18(3), 203-212.
- Ruddell, R., & Unrau, N. (2004). Reading as a meaning-construction process: The reader, the text, and the teacher. In R. Ruddell & N. Unrau (Eds.), *Theoretical models and processes of reading* (5th ed.), pp. 1462-1521. Newark, DE: International Reading.
- Schober, C., Schutte, K., Koler, O., McElvany, N., Gebauer, M. M. (2018). Reciprocal effects between self-efficacy and achievement in mathematics and reading. *Learning and Individual Differences*, 63, 1-11.
- Schunk, D. H. (1996). Goal and self-evaluative influences during children's cognitive skill learning. *Am. Educ. Res. J.* 33, 359-382.
- Schunk, D. H. (2003). Self-efficacy for reading and writing: Influence of modeling, goal setting, and self-evaluation. *Reading & Writing Quarterly*, 19(2), 159-172.
- Shell, D. F., Colvin, C., & Bruning, R. H. (1995). Self-efficacy, attribution, and outcome expectancy mechanisms in reading and writing achievement: Grade-level and achievement-level differences. *Journal of Educational Psychology*, 87(3), 386.
- Silva-Pereyra, J., Bernal, J., Rodríguez-Camacho, M., Yez, G., Prieto-Corona, B., Luviano, L., . . . Rodríguez, H. (2010). Poor reading skills may involve a failure to focus attention.

- NeuroReport*, 21, 34-38.
- Skaalvik, E. M., & Valas, H. (1999). Relations among achievement, self-concept, and motivation in mathematics and language arts: A longitudinal study. *Journal of Experimental Education*, 67, 135-149.
- Smallwood, J., McSpadden, M., & Schooler, J.W. (2008). When attention matters: The curious incident of the wandering mind. *Memory & Cognition*, 36, 1144-1150.
- Smith, J. K., Smith, L. F., Gilmore, A., & Jameson, M. (2012). Students' self-perception of reading ability, enjoyment of reading and reading achievement. *Learning and Individual Differences*, 22, 202-206.
- Spaulding, C.L. (1992). *Motivation in the classroom*. New York: McGraw-Hill.
- Spear-Swerling, L., & Sternberg, R. (1994). The road not taken: An integrative theoretical model for reading disability. *Journal of Learning Disabilities*, 27(2), 91-103.
- Stanovich K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly*, 21(4), 360-407.
- Strahan, D. (2008). Successful teachers develop academic momentum with reluctant students. *Middle School Journal*, 39(5), 4-12.
- Susperreguy, M. I., Davis-Kean, P. E., Duckworth, K., & Chen, M. (2018). Self-concept predicts academic achievement across levels of the achievement distribution: Domain specificity for math and reading. *Child Development*, 89(6), 2196-2214.
- Tharp, R. G., & Gallimore, R. (1988). *Rousing minds to life: Teaching, learning, and schooling in social context*. Cambridge: Cambridge University Press.

- Tunmer, W. E., & Nicholson, T. (2011). The development and teaching of word recognition skill. In M. L. Kamil, P. D. Pearson, E. B. Moje, & P. Afflerbach (Eds.), *Handbook of reading research* (Vol. 4), pp. 405 - 431. New York, NY: Routledge.
- Valentine, J. C., Dubois, D. L., & Cooper, H. (2004). The relation between self-beliefs and academic achievement: A meta-analytic review. *Educational Psychologist*, 39(2), 111-133.
- Webster, J., Morris, J., Malone, J., & Howard, D. (2021). Reading comprehension difficulties in people with aphasia: Investigating personal perception of reading ability, practice, and difficulties. *Aphasiology*, 35(6), 805-823.
- Weisberg, R., & Balajthy, E. (1990). Development of disabled readers' metacomprehension ability through summarization training using expository text: Results of three studies. *Journal of Reading, Writing, and Learning Disabilities International*, 6(2), 117-16.
- Woo, H., & Yoon, I.-J. (2008). Methods for handling incomplete repeated measures data. *Survey Research*, 9(2), 1-27.
- Wu, J.-Y. (2017). University students' motivated attention and use of regulation strategies on social media. *Computers & Education*, 89, 75-90
- Zimmerman, B. J., Bandura, A., & Martinez-Pons, M. (1992). Self-motivation for academic attainment: The role of self-efficacy beliefs and personal goal setting. *American Educational Research Journal*, 29, 663-676.

# 국문 초록

## 1. 연구의 배경 및 목적

지각된 읽기의 어려움은 읽기능력을 예측하는 변인으로 손꼽혀왔지만 (예: Chapman & Tunmer, 2003; Kush, Watkins, & Brookhart, 2005; Rider & Colmar, 2005) 일단 형성되면 잘 변하기 어려운 것이 특징이다. Morgan 외(2008)은 초등학교 1학년으로 진급하고 6개월이 지난 시점에 이미 학생들은 자신의 읽기능력에 대한 인식을 형성하는 것을 밝혔다. 그리고 높은 지각된 읽기의 어려움을 가진 학습자는 읽기 기술이 크게 향상되었음에도 불구하고 그 어려움이 3학년 때까지도 여전히 부정적인 상태에 머물러 있음을 확인하였다. 뉴질랜드의 1학년을 대상으로 실시된 연구에서도 높은 지각된 읽기의 어려움과 낮은 읽기성취는 안정적인 관계를 보였으며, 이는 1학년이 시작되고 6-8주만에 형성되기도 함을 밝혔다(Chapman, Tunmer, & Prochnow, 2000). 이뿐만 아니라 지각된 읽기의 어려움과 읽기성취 간의 관계는 4학년, 7학년, 10학년 사이에 유의한 차이가 없을 정도로 안정적인 것으로 드러났다(Shell et al., 1995). 이러한 연구들은 지각된 읽기의 어려움 자체가 변하기 어려울 정도로 고정적이며, 특히 읽기를 통해 새로운 것을 배워야 하는 단계에 와있는 학생들에게 더욱 그렇다는 것을 확증한다.

그러나 읽기능력을 예측하는 자기인식적 변인은 지각된 읽기의 어려움만 존재하는 것이 아니다. 지각된 주의집중의 어려움 역시 읽기능력을 예측하는 변인으로 알려져 있다(Loper, Hallahan, & Ianna, 1982). 또한, 지각된 읽기의 어려움이 다른 학업적 영역에서의 지각된 어려움에 영향을 미칠 수 있다는 선행연구(Chapman et al., 2000)에 근거하여, 지각된 읽기의 어려움은 지각된 주의집중의 어려움에 영향을 미치고, 이것이 읽기성취로 가는 경로를 매개한다고 가정할 수 있다. 이 두 가지 선행연구의 한계를 종합하여 본 연구에서는 읽기에서의 지각된 어려움이 실제 읽기성취에 영향을 미치는 과정에서 주의집중에서의 지각된 어려움이 이를



매개하는 효과를 드러내고자 하였다.

한편, 이 구조적 관계가 학년에 따라 차이가 있는지의 여부를 검토할 필요가 있다. 지각된 읽기의 어려움과 읽기성취의 종단적 관계에 대한 연구는 많이 이루어져왔으나, 지각된 주의집중의 어려움을 포함한 구조적 관계에 대해서는 잘 탐구되지 않았으므로, 이 관계가 학년에 따라 통계적으로 유의한 차이가 있는지 살펴볼 필요가 있다. 이뿐만 아니라, 구조적 관계가 성취수준(일반성취 혹은 저성취)에 따라 차이가 있는지도 확인할 필요가 있다. 읽기에 영향을 미치는 변인들을 검토하는 주요한 이유는 저성취 혹은 학습부진으로 일컬어지는 학생들의 특성에 맞는 교육적 지원을 계획하기 위해서이다. 저성취 학생에게 부합하는 읽기 중재를 계획하기 위해서는 일반성취 수준에 해당하는 학생들과 저성취 수준에 해당하는 학생들이 보이는 구조적 관계가 다른지 확인하는 작업이 선행되어야 한다. 따라서 본 연구에서는 지각된 읽기의 어려움이 지각된 주의집중의 어려움을 매개로 읽기성취에 미치는 영향을 확인함과 동시에, 이 관계가 학년 및 성취수준에 따라 다른지 여부를 판단하고자 하였다.

## 2. 연구 방법

연구문제를 해결하기 위하여 2021년 3-4월 K도 소재 6개의 초등학교 3-5학년 학생 1,405명을 표집하였으며, 이들의 지각된 읽기 및 주의집중의 어려움과 읽기성취를 측정하였다. 지각된 읽기 및 주의집중의 어려움을 측정하기 위해서는 ‘학습장애 선별검사(Learning Disability Screening Test; LDST; 김동일, 2012)’를 활용하였다. 학습장애 선별검사는 학생 본인이 지각하는 학업능력의 어려움을 평가하여 응답하는 자기보고식 설문조사이다. 연구자는 이 중에서 읽기에 대한 어려움에 대한 문항 4개와 주의집중에 대한 어려움을 나타내는 문항 4개의 정보를 분석에 활용하였다. 또한, 읽기성취를 측정하기 위해서는 ‘기초학습기능 수행평가체제: 어휘검사(Basic Academic Skills Assessment: Vocabulary; BASA: V; 김동일, 2019a)’와 ‘기초학습기능 수행평가체제: 읽기이해검사(Basic

Academic Skills Assessment: Reading Comprehension; BASA: RC; 김동일, 2019b)’를 활용하였다. 각 학생이 얻은 원점수는 학년기준에 따라 T점수와 백분위 점수로 변환되었으며, 두 읽기성취 검사 모두에서 백분위 점수 15점 이하를 획득한 학생들은 김동일(2000)에 따라 저성취로 분류되었다.

자료분석을 위해 사용된 방법은 다음과 같다. 첫째, 연구 변인들의 일반적인 경향성을 살펴보기 위하여 SPSS 통계 프로그램을 활용하여 기술통계 분석 및 Pearson 상관분석을 실시하였다. 기술통계 분석에서는 구조방정식모형을 위한 가정한 정규성 가정을 만족하는지 왜도와 첨도를 통해 확인하였다. 또한, 일원분산분석을 활용하여 학년 및 성취수준에 따라 연구의 주요 변인들이 통계적 차이를 보이는지 검증하였다. 둘째, 주의집중에 대한 자기인식이 가지는 읽기에 대한 자기인식과 읽기성취 간의 매개효과를 검증하기 위해 R의 lavaan 패키지를 활용하여 확인적 요인분석, 구조방정식모형 분석, 그리고 부트스트래핑 방법(N=5,000)을 실시하였다. 셋째, 지각된 읽기의 어려움, 지각된 주의집중의 어려움, 읽기성취 간의 구조적 관계가 학년 및 성취수준에 따라 다른지 파악하기 위하여 다집단분석을 실시하였다. 모든 구조방정식모형 분석에서는 공변량으로 아동의 성별과 다문화가정 소속 여부를 투입하여, 이 두 요인이 구조적 관계에 미치는 영향을 통제하고자 하였다.

### 3. 결과 및 논의

본 연구의 결과와 이에 따른 논의점을 요약하면 다음과 같다. 첫째, 확인적 요인분석, 구조방정식모형 분석, 그리고 부트스트랩 방법을 적용한 결과, 지각된 주의집중의 어려움은 지각된 읽기의 어려움과 읽기성취를 유의하게 매개하는 것으로 나타났다. 즉, 읽기에 대한 긍정적인 자기인식(낮은 어려움에 대한 지각)은 읽기성취에 긍정적인 영향을 미칠 뿐만 아니라, 주의집중에 대한 긍정적인 자기인식(낮은 어려움에 대한 지각)에도 영향을 미치고, 이 주의집중에 대한 긍정적인 자기인식이 결과적으로 읽기성취에 긍정적인 영향을 미치게 된다. 그러므로 교사는 읽기성취에 영

향을 미치는 정서적·인식적 요인들에 대한 정확한 이해를 바탕으로 읽기 및 주의집중에 대한 긍정적 자기인식을 형성할 수 있는 노력을 읽기 그 자체에 대한 중재와 병행해야 할 것이다.

둘째, 이 구조적 관계는 학년에 따라 유의한 차이를 보이지 않았다. 즉, 본 연구에서 대상으로 모집한 3-5학년의 시기에는 연구 변인들 간에 서로 비슷한 영향을 주고받는다라는 사실을 알 수 있다. 초등학교 3-5학년은 ‘읽기 위한 학습’에서 ‘학습을 위한 읽기’로 전환되는 시기이며 (Chapman & Tunmer, 1997), 이 시기에 높은 지각된 읽기의 어려움을 형성하게 된다면 주의집중과 같은 다른 학업적 영역에 대한 자기인식에 부정적인 영향을 끼칠 뿐만 아니라 전반적인 읽기성취에 악영향을 미칠 수 있다. 따라서 이 시기의 학생들에게 읽기를 가르치는 교사는 읽기와 주의집중에 대하여 심각한 지각된 어려움을 획득하지 않도록 더 유념해야 하며, 현재 및 향상된 자신의 집중 상태를 모니터링하는 전략을 명시적으로 가르칠 필요가 있다.

셋째, 지각된 읽기의 어려움, 지각된 주의집중의 어려움, 그리고 읽기 성취의 관계는 성취수준에 따라서도 유의한 차이를 보이지 않았다. 이는 저성취 학생이 자신의 실제 읽기성취에 비해 과도하게 긍정적이거나 부정적인 자기인식을 보이지 않으며, 적절하고 현실적인 자기인식을 가진다는 점을 드러낸다. 저성취 학생들의 지각된 읽기 혹은 주의집중의 어려움은 일반성취 학생들과 마찬가지로 읽기성취를 예측하는 중요한 변수가 될 수 있으므로, 교육현장에서는 읽기 혹은 주의집중에 대한 지각된 어려움을 간편하게 측정함으로써 각 아동이 보일 수 있는 실제 읽기성취의 문제를 예진할 수 있다. 그러므로 교사는 적극적으로 학습장애 선별 검사 등의 도구를 활용하여 학생들의 어려움에 대한 인식을 주기적으로 측정하고, 이를 보충적 중재 대상자 선별에 반영할 필요가 있다.

**주요어 :** 지각된 읽기의 어려움, 지각된 주의집중의 어려움, 읽기 성취, 매개효과, 다집단 분석  
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