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Academic self-concept and reading comprehension among students with learning disabilities: Serial mediating effect of reading anxiety and reading motivation

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Abstract

Background: Students with learning disabilities often struggle to achieve expected academic performance despite average or above-average intelligence. Reading comprehension, a cognitive process involving multiple mental skills, is particularly challenging for these students, with approximately 80% experiencing difficulties.

Aims: This study investigates the relationship between academic self-concept and reading comprehension among middle school students with learning disabilities, focusing on the serial mediating roles of reading anxiety and reading motivation.

Sample(s): The sample consists of 302 middle school students (165 males, 137 females) diagnosed with learning disabilities. The participants included 77 fifth graders, 80 sixth graders, 75 seventh graders and 70 eighth graders.

Methods: Structural equation modelling (SEM) was employed to analyse the data, with reading anxiety and reading motivation considered as mediators.

Results: The SEM results indicated that reading motivation partially mediated the relationship between academic self-concept and reading comprehension, while reading anxiety and reading motivation together fully mediated this relationship.

Conclusions: The findings highlight the importance of addressing both reading anxiety and motivation to improve reading comprehension in students with learning disabilities. Enhancing academic self-concept and reducing reading anxiety can significantly boost reading motivation and comprehension skills.

INTRODUCTION

Learning disability is a definition that characterizes students who have an average or above-average level of intelligence but who do not exhibit the expected success (Sofologi et al., 2022). It is a group whose frequency is increasing day by day among individuals with special needs (Hussar et al., 2020). Learning disabilities are usually recognized at school age. In the international literature, learning disabilities are referred to as reading disabilities (dyslexia), writing disabilities (dysgraphia) and mathematical processing disabilities (dyscalculia). In Turkey, learning disabilities are diagnosed as a general category without specifying subtypes like dyslexia, dyscalculia or dysgraphia (Görgün, 2018). Therefore, the official diagnosis of the students in the study is categorized as a learning disability. After the difficulties encountered in reading skills are recognized, learning disabilities are diagnosed (Judge & Bell, 2011). The ultimate goal of reading skill is reading comprehension (Browder et al., 2013). Reading comprehension is a cognitive process that occurs due to the simultaneous utilization of many cognitive skills (National Reading Panel, 2000). Students with learning disabilities also have problems in many cognitive skills. Therefore, approximately 80% of students with learning disabilities have difficulty in reading comprehension (Quinn et al., 2020). There are studies indicating that students with learning disabilities who show low performance in reading comprehension skills are affected by a number of variables (Edmonds et al., 2009; Roberts et al., 2008).

It has been reported in some studies that students with learning disabilities have an increase in blood pressure and pulse rate before they start reading (Lynch, 2000). This situation is called reading anxiety in the literature (Andrade & Williams, 2009). The relationship between reading skills and reading anxiety is one of the determinants of reading comprehension skills of students with learning disabilities (Owusu Acheaw & Larson, 2014; Ramirez et al., 2019). As a result of the existing anxiety towards reading, students' reading comprehension skills cannot develop sufficiently. As mentioned before, the ultimate goal of reading is reading comprehension (Browder et al., 2013). In addition, considering the cognitive aspect of reading skill, it is possible to say that it will affect the academic skills of students with learning disabilities. Because reading skill forms the basis of many academic skills (McGeown et al., 2015). It is stated in regression studies that the anxiety experienced by students with learning disabilities towards reading is carried to other areas and causes these students to see themselves inadequate in many areas (Austin et al., 2018; Bowring et al., 2019). In studies conducted to eliminate these students "anxiety about reading, it is seen that eliminating anxiety improves students" academic skills, especially their reading comprehension skills (Dagnan et al., 2018; National Institute for Health and Care Excellence, 2016).

Another variable that predicts the reading comprehension skills of students with learning disabilities is motivation (Bender, 2008). Reading motivation is defined as individuals' desire to read written products (Schiefele, 2009). Students with high motivation for reading have higher performance in both reading fluency and reading comprehension skills than students with low motivation (Schaffner et al., 2013). It is stated that students with learning disabilities have low reading motivation (Wei et al., 2021) and therefore have difficulty in reading (Jozwik, 2015). Reading difficulties also cause these students to experience academic unsuccess (Watson et al., 2012). When the studies examining the reading comprehension and motivation for reading of students with learning disabilities in the literature are examined, it is seen that there is a positive relationship between the two (Aikhomu, 2015; Wang et al., 2021). To explain, it can be said that when students with learning disabilities have high motivation for reading, they exhibit higher performance in both reading fluency and reading comprehension skills. For example, Paige (2011) studied 144 students with learning disabilities and 83 students with typically developing students to examine the relationship between motivation, reading fluency, reading comprehension and

academic performance. As a result of the study, it was found that there was a significant and positive relationship between the variables in both groups.

Reading comprehension skills of students with learning disabilities are extremely important in the formation of their academic self-concept. The concept called academic self-concept is that individuals know their academic deficiencies and completeness and approve themselves with these aspects and feel valuable (Sunu & Baidoo-Anu, 2023). Students with learning disabilities perform academically lower than their peers in many areas (McGeown et al., 2015). This situation causes their academic self-concept to be lower than their peers (Deshler et al., 2001; Mckenzie et al., 2020). Low self-concept observed in students with learning disabilities is a common situation (Evans & Allez, 2018). This situation causes students with learning disabilities to have problems in academic skills and various problem behaviours (Parshurami, 2015). There are studies examining the relationship between the academic self-concept of students with learning disabilities and various variables (Alesi et al., 2012; Alkhasawneh et al., 2022; Sucheta & Bharti, 2023). When the findings of the studies are analyzed, it is seen that reading and reading comprehension skills are among the leading variables predicting the academic self-concept of students with learning disabilities. In other words, there is a positive relationship between the reading comprehension skills of students with learning disabilities and their perceived academic self-concept. In addition, there are studies in the literature indicating that studies conducted to increase the academic self-concept of students with learning disabilities are effective (Evans & Allez, 2018; Jokar et al., 2021; Vijayshri & Dutta Roy, 2021). Among these studies, it is stated that practices that support reading and reading comprehension skills are more effective.

Consistent with the outcomes of prior research and theoretical insights, this study explored whether reading anxiety and reading motivation serially mediate the relationship between academic self and reading comprehension in secondary school students with learning disabilities. The lack of research in the literature examining the academic self, reading anxiety, reading motivation and reading comprehension performances of experts who will work in the field of learning disabilities reveals the importance of this research. Moreover, the results of this investigation will aid practitioners by pinpointing the factors that predict reading comprehension in secondary school students with learning disabilities. The following hypotheses were put forth in the study:

H1. Reading motivation mediates the relationship between academic self-concept and reading comprehension of students with learning disabilities.

H2. The association between academic self-concept and reading comprehension is serially mediated by reading anxiety and reading motivation.

METHOD

Participants and procedure

Prior to embarking on the study, the students were apprised of the study's objective. They were cautioned that they had the prerogative to pose inquiries about the study and to withdraw from it without any repercussions. The researchers were responsible for collecting the data. The data collection procedure was conducted in two distinct sessions. In the initial session, which was conducted individually, the participants took the reading comprehension exam. In the second session, which took place in their own classrooms, the students completed the Academic Self-concept, Reading Anxiety and Reading Motivation scales. The measurement tools were administered on paper and pencil. All procedures were concluded within the span of two class hours. There was a 15-min break between the two sessions. This break is given to people to rest, not to get bored and to be able to concentrate. In this way, it is aimed to reduce people's anxiety and to allow them to rest.

A total of 302 students with learning disabilities (165 male and 137 female) were included in the study from the north-eastern region of Türkiye. 77 of the students were in the fifth grade, 80 in the

sixth grade, 75 in the seventh grade and 70 in the eighth grade. In Turkey, identifying students with learning disabilities generally coincides with the primary school years. The main reason is that learning disabilities manifest in academic skills (Pfahl & Powell, 2011). After teachers' suspicions about the child, students with learning disabilities are taken into medical and educational evaluations. Educational diagnosis is made in guidance research centres. Students with learning disabilities are subjected to various tests, especially intelligence tests, and are expected to score over 70 on these tests. In addition, a student's lower performance in academic skills, such as reading, compared to his or her typically developing peers, is diagnosed as a learning disability (Görgün, 2018).

Measures

Matovu academic self-concept scale

The scale developed by Liu and Wang (2005) was adapted into Turkish by Cantekin and Gökler (2019). It is a 20-item scale that measures students' academic self-concept and consists of two subdimensions: Academic Confidence and Academic Effort. It was developed for secondary school students and is a 7-point Likert-type scale. The rating statements are 1 (strongly disagree), 2 (disagree), 3 (partially disagree), 4 (undecided), 5 (partially agree), 6 (agree) and 7 (strongly agree). The Turkish reliability study of the scale was calculated using the Cronbach alpha method. The Cronbach alpha reliability coefficient was calculated as 0.88. The reliability coefficient of the original version of the scale was 0.93. It is thought that the difference between the measurements may be due to cultural factors.

Reading anxiety scale

'Reading Anxiety Scale (RAS)' developed by Melanlıoğlu (2014) for secondary school students was used. The scale provides information on the dimensions of planning the reading process, elements that support reading, and reading comprehension and analysis. The scale, which consists of 14 items in total, is 5-point Likert type. The scale expressions are 1 (never), 2 (very rarely), 3 (occasionally), 4 (usually) and 5 (always). The Cronbach's alpha reliability coefficient was calculated as .84.

Reading motivation scale

The scale developed by Wang and Guthrie (2004) for secondary school students was adapted into Turkish by Yıldız (2010). The Reading Motivation Scale consists of interest (3 items) and curiosity (4 items), competition (4 items), recognition (3 items), social (4 items) and adaptation (3 items) dimensions. The scale has a Likert-type four-point rating structure. The rating statements are 1 (very different from me), 2 (slightly different from me), 3 (somewhat similar to me) and 4 (very similar to me). As the student's score increases, his or her motivation increases. The Turkish reliability study of the scale was calculated with the Cronbach alpha method. The Cronbach alpha reliability coefficient was calculated as 0.87. The reliability coefficient of the original version of the scale is 0.83 for the U.S. and .88 for Chinese. The scale is considered reliable according to the three countries where the validity study was conducted.

Reading comprehension text

The reading comprehension texts in the Informal Reading Inventory were used in this study. The Informal Reading Inventory was developed by Karasu, Girgin and Uzuner in 2013. The fact that

such a comprehensive inventory with validity and reliability has not been found in Turkey is the main reason for the preference for using this inventory. The Informal Reading Inventory includes 18 narrative and 16 informative texts at the 1–8 grade levels, as well as open-ended reading comprehension questions related to these texts. All of the texts used were determined to be intermediate level and 10 open-ended questions were used for each text. Each question was evaluated for 10 points, totalling 100 points. 4 of the questions were open questions with direct answers in the text, 4 were closed questions with no clear answers in the text, and 2 were questions that required students to make their own inferences. A rubric was created by the researchers to score the answers. The rubric includes correct answers for open-ended questions that have direct answers and those that are not explicitly stated in the text. For example, the question "When did the hero go for a walk?" was answered with "At 2 o'clock (5 points), At 2 o'clock in the afternoon (7 points), At 2 o'clock in the afternoon when he finished his homework (10 points)." In short, the more detailed the students' answers, that is, the more descriptions they give, the higher the score they will obtain from the question. There are also possible answers for two questions that students must answer by making their own inferences from the text. To illustrate, "If you were in the protagonist's place, how would you solve the problem if you were in this situation?" I would do the same thing (5 points), tell my teacher about the situation and ask for help (10 points). The content validity of the texts was established through a validity study of the inventory, with experts evaluating the appropriateness of the texts for the age and grade level of the students, the story structure, sentence structure, vocabulary variety, readability levels, evaluation form questions and making necessary adaptations. These studies were carried out using checklists. The reliability of the Informal Reading Inventory was established through the calculation of the inter-rater reliability of the readability levels of the texts, with a reliability calculation using eight stories yielding results between 94% and 100% (Karasu et al., 2013). The Cronbach's alpha reliability coefficient was calculated as .83. The reliability analysis of this study was made on the reading comprehension scores. Reading comprehension scores of students were calculated separately by two researchers. In the reliability calculation, the formula "reliability = consensus/(consensus + disagreement)" developed by Miles and Huberman (1994) was used. In inter-rater reliability calculations, 95% agreement was found.

Data analysis

The relationship between academic self-concept and reading comprehension performance was tested through reading anxiety and reading motivation using a two-stage structural equation modelling approach. Descriptive statistics, including mean, standard deviation, skewness and kurtosis, as well as Pearson correlations, were calculated for all variables. To investigate the research question, Structural Equation Modelling (SEM) in AMOS Graphics was used, following the two-stage approach suggested by Anderson and Gerbing (1988). First, the measurement model was tested, followed by the hypothetical model. The grade was also controlled as a covariate. Studies have shown that grade level has an effect on students' reading skills, anxiety levels and motivation in parallel with developmental processes (Edmonds et al., 2009; Paige, 2011). Therefore, it is thought that students with learning disabilities may show developmental differences at different grade levels, and their academic performance may vary depending on this variable. The inclusion of grade level in the model contributed to the results being more reliable and generally meaningful.

Standardized Root Mean Square Residual (SRMR), Root Mean Square Error Approximation (RMSEA), Comparative Fit Index (CFI), Normed Fit Index (NFI) and Incremental Fit Index (IFI) were used as model fit indices. According to previous research, SRMR and RMSEA values should be less than 0.08, and CFI, TLI, NFI and IFI values should be greater than 0.90 (Hoyle & Panter, 1995). To include the observed variables in the model analysis, the subscales of all scales were used.

RESULTS

Descriptive statistics and correlation

Table 1 shows descriptive statistics and correlations for the study variables. It was found that there was a negative correlation between academic self-concept and reading anxiety and a positive correlation between reading motivation and reading comprehension. There was a negative correlation between reading motivation and reading anxiety and a positive correlation with reading comprehension.

Structural equation modelling

The normality assumption was examined by analysing skewness and kurtosis values, and acceptable values were determined in accordance with the recommendations of George and Mallery (2019) (Table 1). Furthermore, the reliability coefficients were found to be above the acceptable limit of 0.70.

In addition, the multicollinearity was checked using variance inflation factor (VIF), tolerance and Durbin-Watson (DW) values. All tolerance values were above 0.10, and VIF values were below 10. The DW value was 1.53, indicating that there was no significant relationship between the residuals (Hair et al., 2010). After ensuring that these assumptions were met, a two-stage structural equation modelling was initiated. Firstly, the measurement model was analysed.

The measurement model comprised four latent variables—academic self-concept, reading comprehension, reading anxiety and reading motivation—and 14 observed variables. The results of the measurement model show that the model has an acceptable fit with the data: $\chi^2(59) = 186.44$, $p < 0.05$; $\chi^2/df = 3.16$; GFI = 0.91; IFI = 0.90; CFI = 0.90; TLI = 0.97; RMSEA = 0.080; SRMR = 0.078. The factor loadings of the measurement model were between 0.60 and 0.93 ($p < 0.05$). We conducted a serial mediation analysis by applying structural modelling. In the model, we included class as a control variable.

The model (Figure 1) has a good model fit: $\chi^2(71) = 203.48$, $p < 0.05$; $\chi^2/df = 2.86$; GFI = 0.91; IFI = 0.90; CFI = 0.90; TLI = 0.97; RMSEA = 0.079; SRMR = 0.078. Using 5000 bootstrap samples, we investigated the statistical significance of the mediating variable. This method produced confidence intervals (CI) at the 95% confidence level for indirect effects. 95% of confidence intervals that were not greater than zero were considered statistically significant (Hayes, 2018). The relationship between academic self-concept and reading comprehension was partially mediated by reading motivation (0.11, $p < .05$; BCa95% lower bound = 0.01 to upper bound = 0.21). The relationship between academic self-concept and reading comprehension was fully mediated by reading anxiety and reading motivation (−0.01, $p < .05$; BCa95% lower bound = −0.04 to upper bound = −0.01). Academic self-concept positively influences reading motivation ($\beta = 0.63$, $p < 0.05$) and indirectly affects reading comprehension by reducing anxiety and enhancing motivation ($\beta = -0.01$, $p < 0.05$). Table 2 shows the relationships between the variables.

TABLE 1 Descriptive statistics.

| Variables | Descriptive statistics and reliabilities | | | | | | | Correlations | | |
	Mean	SD	Skewness	Kurtosis	α	ω	λ6	1	2	3
1. ASC	90.82	16.99	0.35	−0.37	.88	.89	.89	—		
2. RA	32.69	10.50	0.24	−0.56	.84	.91	.91	−0.13**	—	
3. RM	54.03	12.12	−0.20	−0.01	.87	.90	.91	0.46**	−0.27**	—
4. RC	93.02	17.58	−0.24	−.032	.83	.83	.83	0.09	0.03	0.15**

Abbreviations: ASC, academic self-concept; RA, reading anxiety; RC, reading comprehension; RM, reading motivation.
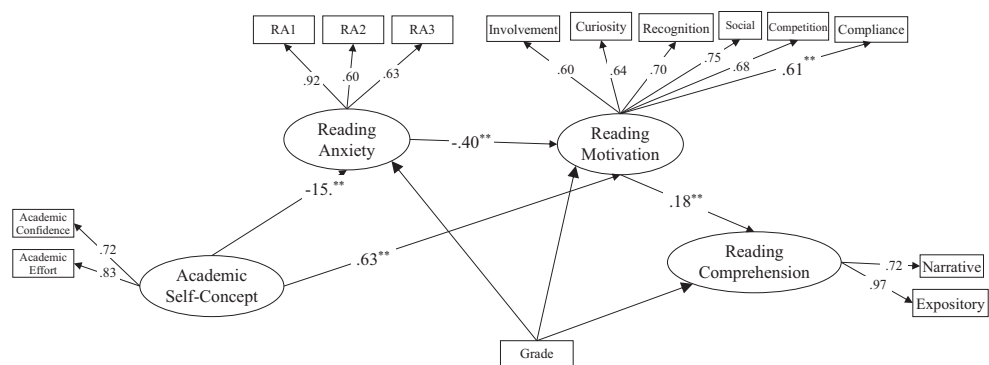**$p < .01$.

FIGURE 1 Standardized factor loading for the *Serial Model*. **p < .01; RA1 planning the reading process, RA2 components that support reading, RA3 reading comprehension and analysis.

TABLE 2 Direct, indirect effects and 95% confidence intervals for the serial model.

Model paths	Coefficient	95% GA	
		Lower	Top
Direct			
ASC ➔ RA	−.15	−.31	−.02
ASC ➔ RM	.63	.50	.74
RA ➔ RM	−.40	.25	.53
RM ➔ RC	.18	.04	.31
Indirect			
ASC ➔ RM ➔ RC	.11	.01	.21
ASC ➔ RA—RM ➔ RC	−.01	−.04	−.01

Abbreviations: ASC, academic self-concept; RA, reading anxiety; RC, reading comprehension; RM, reading motivation.

DISCUSSION

Reading comprehension performance can significantly affect academic skills. In particular, it is important to examine in detail the psychological factors that negatively affect the reading comprehension performance of students with learning disabilities. Zaccoletti et al. (2020) also reported that associated factors, such as anxiety and motivation, should be examined to strengthen the reading comprehension performance of students. In this study, reading anxiety, reading motivation and academic self-concept were examined as related factors.

In addition, it should be known which emotions and thoughts affect the reading comprehension performance of students with learning disabilities. By examining the serial mediating role of these factors in the relationship between academic self-concept and reading comprehension, the study sought to provide insight into how anxiety and motivation affect the reading comprehension performance of students with learning disabilities. The results of the study revealed that reading anxiety and reading motivation play a significant role in mediating the relationship between academic self-concept and reading comprehension. As such, the findings of this study offer important inferences regarding reading comprehension skills and can be used to guide future research and educational practices. The results of the study are discussed in detail below.

Reading motivation as a mediating factor

The relationship between reading motivation, academic self-concept and reading comprehension is multifaceted and intricate. Studies indicate that reading motivation, engagement, frequency and academic self-concept are all strongly linked to reading comprehension, as evidenced by various research findings (McElvany et al., 2008; Naeghel et al., 2012; Wang & Guthrie, 2004). Academic self-concept can influence reading motivation through its mediating effects on students' attitudes and beliefs towards reading tasks (Xia et al., 2019). Conversely, high reading motivation may positively influence academic self-concept by promoting a sense of competence and efficacy in reading tasks (Diasti & Mbato, 2020). Positive academic self-concept can increase motivation, leading to greater effort and perseverance in reading activities and ultimately improving reading comprehension (Chapman et al., 2000). Our study reveals that reading motivation predicts reading comprehension, consistent with previous research finding that high reading motivation is positively related to reading comprehension and positively related to academic self-concept (Wang & Guthrie, 2004). Research has shown that high reading motivation is positively related to reading comprehension and academic self (Wang & Guthrie, 2004). Becker et al. (2010) showed that an intervention that increases intrinsic reading motivation leads to improvements in reading comprehension performance. Therefore, it is not unexpected to see that a student's reading motivation and comprehension are often concurrently higher or lower.

Serial mediation via reading anxiety and reading motivation

The results of this study confirmed the serial mediation model that involves reading anxiety and reading motivation in the relationship between academic self-concept and reading comprehension for students with learning disabilities. Previous research has also explored the connection between reading anxiety and reading motivation, which were both found to be associated with reading comprehension (Becker et al., 2010; Morgan & Fuchs, 2007). When the results of the research examining the reading anxiety of students with learning disabilities in the context of a model were examined, it was noteworthy that reading anxiety had a negative predictive effect on reading motivation. In other words, it can be evaluated that students' reading motivation decreases with the increase in their anxiety levels. When the literature is examined, there are also important relational studies that support the research finding (Alkhateeb, 2014; Liu, 2012; Yamaç & Sezgin, 2018).

In the study, it is one of the important findings of the research that the academic self-concept of students with learning disabilities predicted reading anxiety significantly and negatively. In other words, in the study, it was determined that students' perceiving themselves as competent in reading and capable of coping with difficulties during reading reduced the anxiety they may experience during reading. This finding is consistent with the results of previous studies on the subject (Alkhateeb, 2014; Francis et al., 2019; Katzir et al., 2018). In addition to the studies examining the relationship between academic self-perception and reading anxiety in general, there are also studies conducted at different educational levels examining the predictive effect of the dimensions of academic self-perception on reading anxiety (Hann, 2018; Mills et al., 2006; Zarei & Kavyari Roustai, 2019). Based on the model in this study, it can be said that high self-perception reduces reading anxiety, low anxiety is associated with high reading motivation, and therefore, reading comprehension performance will be positively affected.

The subdimensions planning the reading process and reading comprehension and analysis were observed to increase reading anxiety, particularly in students with learning disabilities. This can be attributed to the higher cognitive demand and self-regulation required in these aspects of reading. Francis et al. (2019) noted that elevated cognitive demands during reading increase anxiety levels in students, while Ramirez et al. (2019) similarly found that high cognitive load can exacerbate reading anxiety. By contrast, the elements that support reading subdimensions showed a weaker association with anxiety, likely because they reflect external support rather than internal challenges. Andrade and

Williams (2009) found that external support can mitigate anxiety, suggesting that students feel less anxious when receiving external assistance rather than facing internal difficulties.

The subdimensions curiosity and recognition emerged as strong predictors of reading motivation. Curiosity is a crucial driver of intrinsic motivation and enhances students' engagement with reading. Schiefele (2009) demonstrated that curiosity strengthens intrinsic motivation, while Becker et al. (2010) found that recognition reinforces motivation and improves reading performance through external rewards. On the contrary, the social and adaptation subdimensions had a weaker impact on reading motivation, likely because these dimensions are more broadly applicable beyond the reading task. McElvany et al. (2008) argued that social dimensions may have limited impact when evaluated in an academic context, while Naeghel et al. (2012) suggested that adaptation is more relevant to the student's general social environment than to specific reading tasks.

The main results of this study highlight the significance of comprehending the processes through which the academic self-concept of students with learning disabilities affects reading comprehension. It is crucial to consider reading anxiety and reading motivation as critical factors that mediate this relationship. The findings suggest that reading interventions that target anxiety and motivation may have implications. Nonetheless, additional research is necessary to gain a deeper understanding of these variables and their potential applications in clinical settings.

IMPLICATIONS

The outcomes of this study have significant implications for comprehending the long-term consequences of the academic self-concept of students with learning disabilities and its potential relationship with academic skills, such as reading. Students with learning disabilities who have a low self-concept may experience high levels of anxiety about reading and low motivation to read, which can ultimately lead to reduced reading comprehension levels. Teachers can incorporate relaxation techniques to address reading anxiety in classrooms and create a supportive and non-judgmental environment. For instance, allowing students to practice reading in smaller groups or individually before presenting to the whole class can help reduce performance pressure. Additionally, integrating mindfulness exercises or positive reinforcement strategies can further alleviate anxiety.

Teachers can use interest-based reading materials that align with students' preferences to enhance reading motivation, fostering curiosity and engagement. While both intrinsic and extrinsic motivation contribute to reading comprehension, the findings of this study suggest that intrinsic motivation, particularly curiosity, plays a more significant role. This aligns with previous research indicating that students with higher intrinsic motivation tend to engage more deeply with reading tasks, leading to better comprehension (Schiefele, 2009; Wang & Guthrie, 2004). Gamification strategies, such as awarding points or badges for reading achievements, can also boost extrinsic motivation. Furthermore, involving students in collaborative reading activities can enhance their social motivation and make the learning experience more enjoyable. Policymakers can support these initiatives by providing professional development programs for teachers and ensuring access to diverse and inclusive reading resources. It is crucial for teachers to recognize the profound impact of psychological factors on students' entire lives and provide a supportive learning environment that promotes their reading comprehension skills. The affective domains of students, including their self-concept, anxiety and motivation, are vital in the reading process, and it is important to incorporate more courses and practices related to "affective domain training" in undergraduate teacher training programs to enhance students' reading comprehension abilities.

LIMITATIONS

This study has certain limitations that need to be taken into account when interpreting its results. First, the cross-sectional design of the study does not allow for a cause-and-effect relationship to be

established. It would be more suitable for investigating causes and effects to use an experimental or longitudinal design. Second, the data collection process relied on self-report instruments, which could have resulted in response bias. To address this issue, future studies could make use of observational techniques or conduct interviews to ensure a more accurate and comprehensive assessment of the variables being studied. In this study, the relationship between reading comprehension skills and academic self-concept and reading motivation was examined, but word reading skills were not included. In future research, it is recommended to create a more comprehensive model by evaluating the potential effects of word reading skills on reading motivation and academic self-concept, especially for students with learning disabilities. Finally, while the study's participants were recruited from three provinces in Turkey, the use of convenience sampling may have an impact on the generalizability of the findings.

CONCLUSION

In conclusion, this study offers significant information regarding the area of reading comprehension for students with learning disabilities in the context of Turkish culture. While acknowledging certain limitations, the results back up the proposed model, which posits that reading anxiety and motivation serve as mediators between academic self-concept and reading comprehension in students with learning disabilities.

AUTHOR CONTRIBUTIONS
Halime Miray Sümer Dodur: Conceptualization; methodology; writing – review and editing. **Mustafa Ceylan:** Writing – review and editing; conceptualization.

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No conflict of interest exists for this manuscript for any of the authors.

DATA AVAILABILITY STATEMENT
Data will be available on request.

ETHICS STATEMENT
The study protocol has been approved by Artvin Coruh University Scientific Research and Ethical Review Board (E-18457941-050.99-117,058). The study was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its subsequent updates.

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