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THE EFFECT OF EMOTIONAL INTELLIGENCE, WORKING MEMORY , AND SELECTIVE ATTENTION ON READING COMPREHENSION OF STUDENTS WITH LEARNING DIFFICULTIES IN LEBANESE INCLUSIVE SCHOOLS

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Abstract

Emotional intelligence (EI) and executive functions (EFs) are constructs deemed vital for academic achievement. Selective attention and working memory as EF skills are relevant to the acquisition of reading comprehension. Social emotional learning (SEL) programs have a positive effect on EI competencies and academic achievement. There is little existing research on the effect of the relationship between EI and EF on reading comprehension of students with learning difficulties at the elementary level, particularly in the Lebanese context. This research investigates the effect of the MindUP SEL program on EI, working memory, and selective attention in students with learning difficulties, subsequently studying the impact of the relationship between EI and working memory, and EI and selective attention on reading comprehension. The experimental pre-test/post-test research design was employed utilizing experimental and control groups in random selection. The sample comprised all 63 fourth and fifth graders with learning difficulties enrolled at two Lebanese inclusive schools in Beirut area. Results suggest a huge effect for the MindUp program on emotional intelligence, working memory, and selective attention. The ANOVA results did not reveal a significant relationship between EI and working memory or between EI and selective attention on reading comprehension. However, working memory explained 15.1% of the variance in reading comprehension. Implications for future suggestions are discussed.

Keywords: Emotional intelligence, learning difficulties, selective attention, social emotional learning, working memory

1. Introduction

Conceptualizations of emotional intelligence have entailed different related theories that can be clustered in frameworks that portray cognitive ability, competence, and mixed trait that includes personality and social emotional intelligence (Hughes & Evans, 2018). The ability model based on Mayer-Salovy (1999) stresses the notion that EI is an intellectual ability separate from intelligence quotient. The competency model draws on Goleman's theory that describes emotional intelligence as clusters of capabilities divided into four broad areas: "self-awareness," "self-management," awareness of others and empathy, and management of social relationships. His research has centred on the importance of emotional intelligence in the workplace and leadership (Goleman, 2001). The mixed trait model combines emotional abilities

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with personality characteristics that affect an individual's normal way of thinking, feelings, and behaviors (Punia, Dutta & Sharma, 2015).

The growing interest in research regarding emotional intelligence has impelled the inquiry for sound experiential studies linking the effect of social emotional learning training on emotional intelligence that in turn improve behavior and academic performance (Dhani, & Sharma, 2016; Gayathri & Meenakshi, 2013; Maul, 2011).

Concerning the field of learning difficulties, emotional intelligence is a crucial element that permits students with learning difficulties to face various challenges imposed by the difficulty (Singh, 2017). These challenges are exemplified by frustration, anxiety, low self-esteem, understanding of nonverbal cues, experiencing stress as a result of the difficulty in expressing emotions, and the inability to cope with the rigorous requirements of the regular curriculum (Genik, Millet & McMurtry, 2020; Singh, 2017).

1.1 Social Emotional Learning

The Collaborative for Academic, Social, and Emotional Learning (CASEL) organization has delineated a framework consisting of five social emotional learning proficiencies including intellectual, emotional, and behavioral skills that relate to emotional intelligence. The fundamental proficiencies are "self-awareness," "self-management," "social awareness," "relationship skills," and "responsible decision-making skills" (CASEL, 2020).

The same skills of emotional intelligence emerge by looking into the different social emotional learning outcomes. The social emotional learning outcomes for elementary and middle school children were classified into three main realms: cognitive control, emotional processing, and social skills (Jones, Barnes, Bailey, Doolittle, 2017).

Another pivotal point for researchers in the field has been to study the best way to enhance emotional intelligence through training. Social emotional learning programs emerged as the main vehicle to promote emotional intelligence with mindfulness as a construct to improve emotional and academic skills (Janz, Dawe & Wyllie, 2019; Jones, 2018; Ritter & Alvarez, 2020). Mindfulness was defined by Kabat-Zinn (2003) as "paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" (p. 145). It is characterized by awareness of the current state of the mind and body without judgment, embellishment, or affection (Burke, 2010; Eberth & Sedlmeier, 2012).

1.2 Executive Functions

Executive functions denote an array of cognitive skills such as working memory, attention, inhibition control, and planning, which are crucial to thought and cognitive management in the effort to realize directed aspirations (Friedman, & Miyake, 2017; Huizinga, Baeyens, & Burack, 2018). More specifically, executive function skills of working memory and selective attention are interlinked with reading comprehension. Role of working memory in reading comprehension is noted when students keep in mind text ideas from the beginning till the end to make sense and construct meaning. Selective attention is important to extract relevant information and discard irrelevant one during reading to give correct answers in reading comprehension (Borella, Carretti, & Pelegrina, 2010; Cartwright, 2012).

Reading comprehension is pivotal for the learning of all academic domains. It is a complex process that includes the interaction of many cognitive skills and affective factors (Sanford, 2015; Slattery et al., 2021). Research suggests that the foundations of comprehension deficit in students with learning difficulties is related to language based difficulties, and working memory as it impedes reading comprehension (Cartwright, 2012; Jacob & Parkinson, 2015). Other research proposes emotional intelligence as an affective factor that contributes to adequate comprehension (Hermawati, 2018).

In regard to students with learning difficulties, a scarcity of literature addresses the relationship between emotional intelligence and language in general, specifically reading comprehension. Most studies examined the relationship between emotional intelligence and

social competence for students with learning difficulties (Bratitsis & Ziannas, 2015; D'Amico & Guastaferro, 2017).

There is an extensive amount of published research describing executive functions and their role in the education of students with learning difficulties, in addition to the literature examining emotional intelligence (Watson, Gable, & Morin, 2016). Nonetheless, in general, there is limited research on the impact of the relation between these two concepts on academic performance, specifically reading comprehension.

As a result of this dearth of evidence, and because reading comprehension is a crucial factor for achievement in all content areas, it is essential to study the relationship between emotional intelligence, executive functions, and reading comprehension in students with learning difficulties. Additionally, it is warranted to mention the existence of scant information examining the relationship between these two constructs among students with learning difficulties in the Lebanese context.

Thus, this study aimed to investigate the effect of the MindUP social emotional program on emotional intelligence and executive functions and the effect of the relationship between them on the reading comprehension for children with learning difficulties.

The following hypotheses were posited to investigate the impact of the relationship between emotional intelligence and executive functions on reading comprehension of students with learning difficulties.

1. Students with learning difficulties trained on the MindUP social emotional learning program will score higher on emotional intelligence than students who were not trained on the MindUp social emotional learning program.
2. Students with learning difficulties trained on the MindUP social emotional learning program will score higher on working memory as one skill of executive functions than students who were not trained on the MindUp social emotional learning program.
3. Students with learning difficulties trained on the MindUP social emotional learning program will score higher on selective attention as one skill of executive functions than students who were not trained on the MindUp social emotional learning program.
4. There is an effect for the relationship between emotional intelligence and working memory on reading comprehension of students with learning difficulties.
5. There is an effect for the relationship between emotional intelligence and selective attention on reading comprehension of students with learning difficulties.

2. Literature Review

Diagnoses of mental health and students receiving special education services are the rising over the years. The number of students enrolled in special education increased from 6.4 million during the 2011-2012 scholastic years, to 7.1 million during 2018-2019 year (NCES, 2020). Children ages 6-17 showed an increased rate in depression and anxiety from 5.4% in 2003 to 8.4% in 2011-2012 (CDC, 2021).

The growing numbers in mental health cases and special education enrolment led schools to seek evidenced based programs to assist these students cope and succeed not only in school but in daily life. Social emotional learning and mindfulness have gotten to be progressively vital in accelerating the development of students who may be affected by these conditions.

According to the study by Faramarzi and Enayati (2021), emotional problems differ in relation to the type of learning difficulty. The authors found that students with reading difficulties revealed significant higher anger and anxiety levels than those with mathematics and writing difficulties. Whereas results indicated that the feeling of pleasure was the highest in students with writing difficulties.

Students with learning difficulties reveal a lower level of emotional intelligence in comparison to students without learning difficulties. The ex post facto study by Bahramiyan,

Maktabi, and Morovati (2014) indicated lower emotional intelligence for second and third grade students with learning difficulties (M = 114.80) compared to students without learning difficulties (M = 131.43) on the Emotional Quotient Inventory, Youth Version (EQ-i: YV).

Several studies have shown that SEL programs have a significant impact on the enhancement of EI skills in students with learning difficulties. The study by Filippelio, Marino, Spadaro, and Sorrenti, (2013) examined how students with LD react to speculative interpersonal conflicts by utilizing social stories in comparison to students without LD. Participants were 28 students from 8 to 10 years old, equally distributed between the experimental (LD students) and control groups (students without LD). Results of the ANOVA showed a statistically significant difference between the two groups in terms of copying and using assertive strategies to deal with interpersonal conflicts. The experimental group revealed the use of assertive strategy (t (26) = -2.18, $p < .05$), versus aggressive strategy for the control group (t (26) = 2.14, $p < .05$).

McLean (2016) investigated the possible association between emotional intelligence and learning difficulties. Results indicated a positive association and especially support the proposition that there is a correlation between emotional expression and recognition of others' feelings, emotional management, and learning difficulties. Lower Pearson product-moment coefficient scores (r range = -.06 to -0.24, p < .05) were linked to more reading difficulty signs. Lower Pearson product-moment coefficient scores (r range = -.06 to -0.29, p < .001) were also associated with more mathematics difficulty signs.

A randomized controlled study examined the relationship between social emotional learning intervention and improvement of the indicators of learning difficulties (Keller, Ruthruff, & Keller, 2019). Independent t-tests were calculated on these differences to examine the effect of the experimental group on the control group. Results indicated progress in writing, reading, self-awareness, self-efficacy, and the use of metacognitive strategies.

The study by Nachshon and Horowitz-Kraus (2019) revealed a significant negative relationship between emotional intelligence and reading difficulties. The sample included 98 children ages 8-12 distributed between the reading difficulty group (N = 42) and the control group (N = 56). Results from the Pearson correlation indicated that reading difficulties were associated with greater emotional difficulties. Emotional ability was negatively correlated with spelling abilities ($r = -0.321$, $p < .01$), timetabled decoding ($r = -0.293$, $p < .01$), and reading comprehension ($r = -0.25$, $p < .05$) for both groups.

The results of the study by Bryant (2007) revealed a positive relationship between emotional intelligence and reading comprehension for secondary students with learning difficulties. Participants were 49 students ages 14 to 18 in the 10^{th}, 11^{th}, and 12^{th} grades.

Pearson Product-Moment Correlation Coefficient results revealed a significant correlation (r = .90, p =.000), indicating a strong relationship between EI and reading comprehension.

2.1 Executive Functions

Many operational definitions of executive functions were conceived throughout the literature. However, all agreed that executive functions are responsible for emotion regulation as well as academic achievement (Ardila, 2018; Barkley, 2012; Diamond, 2013).

In the context of special education, executive functions are the processes underlying the interweaving between neuropsychology and neuroscience to better understand cognitive functions underlying academic achievement and emotion regulation (Friedman, & Miyake, 2017; Predescu, Sipos, Costescu, Ciocan, & Rus, 2020).

Executive function deficits are common in students with learning disabilities who struggle to organize assignments, set appropriate goals, and evaluate performance (Ness & Middleton, 2011). A deficit in self-control abilities can lead to an unremittingly low

achievement level, which can result in school resentment and exasperation (Korinek & deFur, 2016).

Students with learning disabilities lack the ability to coordinate a wide range of cognitive skills manifested in executive function skills while learning and studying in order to produce satisfactory results on a variety of academic tasks and social emotional situations (Predescu et al., 2020; Rozek1 & Stobäus, 2016). Precisely, they often have problems with organizing, arranging, and storing information for later retrieval from memory. Consequently, information may become blocked or jammed, and they cannot easily provide responses or shift attention between two or more tasks (Pullen, 2016). These difficulties, exemplified as executive function difficulties, become more apparent as the complexity and conceptual depth of the academic curriculum increase.

The impact of an executive function deficit on students with learning difficulties reflects on academic performance in different areas such as reading comprehension, written expression, mathematics, study skills, and test taking. For instance, written expression includes successive executive function skills ranging from identification of the mechanical skills to planning and jotting the outline, organization, and development of well-structured, cohesive topics (Graham & Harris, 2011; Schumaker & Deshler, 2009).

Working memory helps students with learning disabilities understand the syntactic structure of texts. The effect of intervention to improve syntactical ability and thus reading comprehension and the relationship to working memory capacity were investigated in the study by Standford and Delage (2019). The intervention targeted how students understood wh-questions and relative clauses. Results indicated that students with working memory deficit revealed more difficulty understanding syntactical structures, which affected comprehension level.

The causative relationship between working memory and learning difficulties was explored in the study by Zakopoulou, Sarris, Zaragkas, Tsampalas, and Vergou (2019). Correlational analysis by Pearson Chi-Square (34.737, $p = 0.000$) indicated that students with learning difficulties scored significantly lesser than typical students, suggesting a strong relation between working memory and learning difficulties.

A study examined the relationship between executive functions and reading comprehension for students with learning difficulties. The sample comprised 29 students from the third through ninth grades. Results revealed significant correlations between reading comprehension and executive function skills ranging from moderate to high. The highest performance was in selective attention and working memory (Porto Bovo, Franco de Lima, Pinto da Silva, & Ciasca, 2016).

The quasi-experimental pretest-posttest research design study with a control group by Bardideh, Bardideh, Sharif, and Abdekhodaei (2020) investigated the role of social emotional learning training in enhancing cognitive emotion regulation with students with learning difficulties. Participates included all females from fourth till sixth grades. The mindfulness sessions were carried over for 12 sessions of 90 minutes each. Results indicated a decrease in the means of the negative regulation strategies from pre-test ($M = 27.60$) to post-test ($M = 13.80$) for the experimental group. Whereas, the decrease was less for the control group from pre-test ($M = 27.13$) to post-test ($M = 26.33$). This implies that after training, the use of negative regulation strategies decreased for the experimental group. The means for using positive regulation strategies increased from pre-test ($M = 21.06$) to post-test ($M = 37.46$) for the experimental group, and there was a non-significant difference from pre-test ($M = 21.20$) to post-test ($M = 20.60$) for the control group. There was a significant difference between the experimental and control groups after controlling for pre-test on the use of negative strategies for emotion regulation ($F = 285.49$, $p < .001$), and ($F = 588.03$, $p < .001$) for the use of positive

emotion regulation strategies by utilizing one-way analysis of covariance. Simply put, mindfulness training significantly increased the deployment of positive cognitive regulation techniques, and decreased the use of negative emotion regulation strategies.

Felver, Felver, Margolis, Ravitch, Romer, and Horner (2017) examined the effectiveness of the Soles of the Feet (SOF) social emotional learning program among students receiving special education services. Students revealed a low academic engagement level and an elevated level of disruptive behavior. Participants were four students in the fourth, sixth, and seventh grades. The students spent half of the school day in an inclusive class, and the other half in a self-contained special education classroom.

The experimental design was a pre-test, post-test, single-subject research design. Behavior observation was conducted for one week to collect baseline data, and intervention was performed on an individual basis for every student. The intervention was carried out for 20–30 minute sessions each day. The SOF curriculum consists of mindful breathing, paying attention to the foot, activities to diminish robust emotional conditions, practices to maintain positive feelings, self-regulation to avoid negative feelings, and planning for practice to consider antecedent conditions that might lead to negative feelings and disruptive behavior.

The "non-overlap" of all pairs effect size statistic (NAP) before and after intervention was used to measure academic engagement. Results differed for every student ranging from 27.2% at baseline to 83.5% after SOF intervention. The NAP effect size ranged from 81% to 100%.

The social validity of SOF was established by both students and teachers. Students agreed with the statements in the questionnaire, such as "I liked doing Soles of the Feet" and "I think Soles of the Feet will help me do better in school." Teachers did not report any apparent difficulties in applying the SOF curriculum, and they would recommend the curriculum to other teachers.

3. Methodology

3.1 Context

The study design is a true experimental pre-test/post-test design utilizing experimental and control groups. This experimental procedure allows for the study of the effect of a specific intervention on the outcomes. The intervention was implemented by employing the MindUp social emotional learning program to measure the change in the dependent variables, namely, emotional intelligence, working memory, selective attention, and reading comprehension, before and after the intervention. This design allows for random sampling to assure that both the experimental and control groups have an equal and objective opportunity to participate in the study.

3.2 Participants

The study sample was comprised of all fourth and fifth graders with learning difficulties in two inclusive schools in the Beirut area. The schools implement inclusive pedagogy for students with learning difficulties from kindergarten through twelfth grade. The schools have never systematically implemented a social emotional learning program. The total sample comprised 63 students, which constitutes (n = 12.3%) of the total population.

Purposive sampling was used as a first sampling technique since the researcher deliberately selected all students with learning difficulties as they are all diagnosed with working memory, selective attention, and reading comprehension deficits. Random sampling was employed as a second sampling technique to divide the sample between the experimental and control groups. The sample of 63 students consisted of 32 fourth graders, and 31 fifth graders (45 boys, and 18 girls), ranging in age from 9years and 3months to 11years and 5months. The experimental group number was (N = 30, 20 males, and 10 females), and the control group number was (N = 33, 25 males, and 8 females). The mean age of fourth graders

was 9 years, 7 months, and that of fifth graders was 10 years, 5 months. Table 1 details the descriptive characteristics of the final sample.

Table 1

Descriptive Information of the Participating Students

	Experimental N=30			Control N= 33		
Grade	**N n(%)**	**Males**	**Females**	**N n(%)**	**Males**	**Females**
Fourth	14 (22.2)	**7**	**7**	18 (28.6)	**12**	**6**
Fifth	16 (25.4)	**13**	**3**	15 (23.8)	**13**	**2**

3.3 Procedures

The procedure consisted of three implementation phases. The first phase was the administration of the tests to collect data for pre-test scores at baseline before intervention.

The testing session started with explaining the purpose of the testing, and clarifying that the tests are not related to school work and are not graded. It was made clear that students could ask questions to ensure adequate understanding due to comprehension problems. The reading comprehension, selective attention, and Schutte Self-Report Emotional Intelligence Test (SSEIT) were administered to all students at the same time since they listened to and followed the same instructions. The reading comprehension test required students to complete sentences with the right word depending on the context of each sentence. During the selective attention test, students had to circle the two identical letters or strings of letters in rows of distracters. This test has a time limit of three minutes. The working memory test was individually administered because students needed to recall information according to specific instructions for each item. The average time to administer the working memory test was 15 minutes. The researcher corrected and scored the tests to obtain the raw scores for working memory and selective attention before entering the data on the online scoring program for the Wood-cock Johnson IV of Cognitive Ability and the Wood-cock Johnson IV Test of Achievement for reading comprehension. The online scoring programs convert the raw scores into standardized scores, age and grade equivalent levels, and percentile ranks. The percentile ranks describe the individual's performance relative to all individuals at the same age level in the population.

The SSEIT was manually corrected and scored, and the results were tabulated. After coding the response forms with numbers and removing any identifying information, the researcher gave the responses to the data analyst specialist for analysis on the Statistical Package for the Social Sciences (SPSS).

The second phase was the implementation of the MindUp social emotional learning curriculum by the researcher. The 15 lessons were covered in 30 sessions of one hour and a half each, held twice weekly. Sessions included application of the activities as delineated in the lessons, and students engaged in several strategies such as brainstorming, role playing, and cooperative learning.

The third phase included the administration of the same tests to the experimental group to test the hypotheses. The same steps of administration and scoring were applied as in the first phase to collect the post-test data.

3.4 Instrumentations

Measurement tools included the MindUp social-emotional learning program, the Schutte Self Report Emotional Intelligence Test (SSEIT), the Wood-cock Johnson IV Tests of Cognitive Abilities (WJ IV), and the Wood-cock Johnson IV Tests of Achievement.

The MindUP Program: The program was developed by renowned experts in the fields of neuroscience, social emotional learning, mindfulness, and positive psychology (Jones, Brush, Bailey, Brion-Meisels, McIntyre, Kahn, Nelson, & Stickle, 2017). It is based on the Collaborative for Academic, Social, and Emotional Learning (CASEL) social emotional learning framework (CASEL, 2020). The program consists of four units comprised of 15 lessons.

The Schutte Self-Report Emotional Intelligence Test (SSEIT): The test originated from the model proposed by Salovey and Mayer (1990). The test included three discrete emotional intelligence factors: understanding and expression of emotions in oneself and others, emotion regulation in oneself and others, and emotion deployment in problem solving (Schutte, Malouff, & Bhullar, 2009). The test encompasses 33 items on a five-point Lickert type scale from 1 (*strongly disagree)* to 5 (*strongly agree).* Total scores are calculated for all items, with the scoring of items 5, 28, and 33 reversed. For instance, if the answer was 1 = *strongly disagree* for item 33, "It is difficult for me to understand why people feel the way they do," then it would be scored as 5 = *strongly agree*. Scores can range from 33 to 165; the higher the score, the greater the indication of more emotional intelligence characteristics.

The Woodcock-Johnson IV (WJ IV) Tests of Cognitive Abilities: The test includes 18 subtests that measure different cognitive abilities to determine general intellectual ability. Two subtests were utilized in this study. The Verbal Attention subtest was used to measure working memory. Tasks require students to store and manipulate information according to instructions. Students are exposed to a number of intertwined series of animal names and digits. They store the series in their immediate memory and work on the series in order to answer a specific question about each series. For example, the student may hear the sequence "Dog, 5, 2, Cat,..." and then respond to the question "What is the second number?" The test consists of 36 items, scoring 1 for the correct answer and 0 for the incorrect one. The series becomes increasingly difficult as the number of digits and names increases.

The Letter-Pattern matching subtest comprises 84 items. It measures the ability in selective attention. Students were given three minutes to circle the two identical letters or groups of letters among the distracters. For example, students circle “bl” in the series “bl va dl bl na.” The items range from simple series with single letters and distracters to more difficult series of four-letter patterns.

The Wood-cock Johnson IV (WJ IV) Tests of Achievement: The test (Schrank & Mather, McGrew, 2014) includes 20 tests that cover reading, reading comprehension, mathematics, spelling, written language, science, social studies, humanities, and fluency in reading, mathematics, and writing. The tests can be used to determine performance level, diagnose specific learning difficulties, and inform educational planning (Schrank et al., 2014).

The passage comprehension test consists of 52 items. It requires students to recognize and write the missing word first in sentences and then in paragraphs. The items become more difficult in terms of increasing passage length, vocabulary level, and complexity of sentence structure. In this manner, performance reflects comprehension through the ability to utilize contextual cues to write down the correct word.

3.5 Data Analyses

The data obtained from scores on the pre-tests and post-tests of the different tests were analyzed using descriptive and inferential statistical methods using the Statistical Package for the Social Sciences (SPSS 25). Descriptive statistical analysis was used to test the first three hypotheses to investigate the effect of the MindUP social emotional program on the experimental group in comparison to the control group on the dependent variables, namely,

emotional intelligence, selective attention, and working memory. The independent sample t-test was used to compare the means of the experimental and control groups with respect to the effect of the MindUP program. The paired sample test was used to further examine whether the individual characteristics of each student with learning difficulties might yield different outcomes.

Inferential statistics employed multiple regressions using ANOVA analysis to determine which of the variables, namely, selective attention and working memory, is a better predictor of reading comprehension achievement. It is used to answer hypotheses four and five.

4. **Results**

Independent sample t-test results indicated a significant huge effect for the MindUp social emotional learning program in comparison to the control group with respect to all the dependent variables, namely emotional intelligence, working memory, and selective attention at $p < .05$ (Table 1). Leven's test was used to test for equality of variance to determine the equivalency of the experimental and control groups. Accordingly, the t-tests and p values were computed. Table 2 provides the results of the first three hypotheses:

Table 2

Means and Standard Deviations of the Experimental and Control Groups

Measure	**Experimental**					**Control**				
	M	N	SD	Difference	SE	M	N	SD	Difference	SE
Emotional Intelligence	137.53	30	9.84	55.35	3.076	82.18	33	13.990	55.35	3.076
Selective Attention	98.93	30	9.62	19.81	4.031	79.12	33	20.074	19.81	4.031
Working Memory	112.00	30	6.07	28.12	1.975	83.88	33	9.134	28.12	1.975
Reading Comprehension	52.77	30	7.45	0.56	1.988	52.21	33	8.263	0.56	1.988

Results indicated that the experimental mean is greater than the control mean on reading comprehension, but the difference is not significant. The experimental mean ($M = 52.77$, $SD = 8.253$), in comparison to the control group ($M = 52.21$, $SD = 8.253$), $t\ (61) = 0.282$, $d = 0.07$, $P = .7792 > .05$

Paired sample t-test was used to measure the effect of the intervention at two separate times for the experimental group. It determines if there is a statistical proof that the mean difference between paired observations is substantially different from zero. Results indicated a statistically significant positive effect of training on the MindUp social emotional learning program on emotional intelligence, working memory, and selective attention.

The mean of emotional intelligence increased significantly from pretest to posttest at $p < .05$ ($M = 82.20$, $SD = 22.43$) to ($M = 137.53$, $SD = 9.84$). Similarly, there was an increase in the mean at $p < .05$ from ($M = 82.83$, $SD = 9.34$), to ($M = 98.93$, $SD = 9.62$) for selective attention, and from ($M = 81.50$, $SD = 9.88$), to ($M = 112.00$, $SD = 6.07$) for working memory at $P < .05$.

Multiple regression results indicated that the relationship between emotional intelligence and working memory had a significant effect on reading comprehension, $F\ (1, 28) = 6.16$, $p = 0.019$. Emotional intelligence was excluded because the effect was non-significant on reading comprehension, neither alone nor together with working memory. Table 3 shows

that the predictive variable working memory explains 15.1% of the variance in reading comprehension (adjusted R square = 15.1%).

Table 3

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimates
	4.25[a]	.180	.151	6.868

a. Predictors: (Constant), Working Memory

Emotional intelligence was excluded from the regression because its effect on the dependent variable, reading comprehension, is not significant, neither alone nor together with working memory ($p = 0.128 > 0.05$).

Regarding hypothesis five, there was a non-significant effect for emotional intelligence, neither alone nor in combination with selective attention, on reading comprehension. In addition, the effect of emotional intelligence on selective attention was not statistically significant $F\ (1, 28) = 0.15$, $p = .705 > .05$.

4. Discussion

The primary research objective of the study was to investigate the probable effect of the relationship between emotional intelligence and executive functions on reading comprehension for students with learning difficulties in the Lebanese context.

Overall findings revealed a significant effect of training on the MindUp social emotional learning on emotional intelligence and executive skills, namely working memory and selective attention. This can be deemed remarkable considering the small size of the students.

There was no effect of the relationship between emotional intelligence and executive functions on reading comprehension. However, ANOVA results revealed an effect for one predictable variable, which is working memory on reading comprehension. Similarly, emotional intelligence and selective attention had a non-significant effect on reading comprehension.

The findings support the first three hypotheses. The results resonate with the research on social emotional learning and emotional intelligence for students with learning difficulties (Hassani & Schwab, 2021; Malboeuf-Hurtubise Lacourse, Herba, Taylor & Amor, 2017; Olson, 2018; Shihadih, 2019). This is very encouraging since students reveal a lower emotional intelligence level than typical students (Bahramiyan, Maktabi, and Morovati, 2014**).**

The data supported the hypothesis that social-emotional learning interventions foster emotional intelligence, which in turn improves learned helplessness. Training on topics such as “mindful awareness," "focused awareness," and "mindful listening" changed students’ responses on the Self-Report Emotional Intelligence Test (SREIT). For instance, their rating scores increased on items such as "I expect that I will do well on most things I try," "I have control over my emotions," and "When I am faced with a challenge; I give up because I believe I will fail." This implies that emotional intelligence can contribute to enhancing learned helplessness. Learned helplessness is the result of an external locus of control because students attribute their success to external factors such as easy tests or kind teachers. For example, students with reading difficulty believe that their problems cannot be enhanced with practice and effort (Koles & Boyle, 2013).

Findings revealed a significant difference between the experimental and control groups on working memory. This is in accordance with the findings of Ghorbani & Jabbari (2020) study, which found that social emotional learning training reduced anxiety levels, which affected working memory capacity by increasing attention to one's own feelings and thoughts in students with learning difficulties.

The effect on selective attention is consistent with the study by Schonert-Reichl et al. (2015), who found an increase in inhibitory control and selective attention after intervention through the MindUp social-emotional program with fourth and fifth grade students with learning difficulties. The effect of mindfulness training through a social emotional program on the impulsivity of students with learning disabilities suggests a benefit on attention processes, including selective attention (Alqarni & Hammad, 2021).

The result of the non-significant impact of emotional intelligence on reading comprehension can be explained by the relationship between the development of emotional intelligence and age. Emotional intelligence is nurtured through both informal interactions in life, and regular education to foster the use and understanding of emotion vocabulary, and learn effective emotion regulation strategies (Brackett, & Cipriano, 2021). The authors contend also that emotional intelligence takes time to develop and should be cultivated in all contexts, of home, school, and the workplace. From this perspective and the characteristics of students with learning difficulties, it can be extrapolated that the effect of emotional intelligence on performance requires more time.

The results were not in accord with expectations concerning the effect of emotional intelligence on reading comprehension, since previous studies indicated a positive correlation between emotional intelligence and reading comprehension at the secondary level (Bryant, 2007; Hermawati, 2018). Nachshon and Horowitz-Kraus (2019) found a negative correlation between emotional intelligence and reading comprehension. Nonetheless, this could be explained by the characteristics of the students at the elementary and secondary levels.

The extant research revealed partial support for the fourth hypothesis since only working memory had an effect on reading comprehension. The multiple regression conducted indicated that only working memory explained 15.1% of the variance in reading comprehension. Whereas, emotional intelligence was excluded from the model because, neither alone nor in combination with working memory, had an effect on reading comprehension.

The role of working memory in reading comprehension is depicted in this study, where working memory accounted for 18.1% of the variance in reading comprehension for the control group. Another explanation for the results is the effect of individual variations in working memory capacity and learning English as a second language, in accordance with the study by Shin (2020). The present results imply the feasibility to predicting reading comprehension problems by employing working memory because it facilitates early diagnosis and intervention.

The relationship between working memory and reading comprehension was established in the study by Swanson, Orosco, and Kudo (2017). The executive factor of working memory was significantly related to reading comprehension in students with reading difficulties in the first, second, and third grades for English as a second language. Implications from this research coincide with the results of this study as it relate to the sample of the study in terms of reading difficulty and learning English as a second language. Multiple regression analysis for factors affecting reading comprehension for secondary students with learning difficulties indicated a positive correlation between working memory and reading comprehension (Sanford, 2015).

The contribution of working memory to reading comprehension is supported by research delineating the effect of training on working memory and improvement in reading comprehension. Working memory intervention was conducted through different memory tasks such as repetition of digit sequences and pseudo words with fourth and fifth grade students with comprehension difficulties (Novaes, Zuanetti, & Fukuda, 2019). Furthermore, the results of the study by Nicolielo-Carrilho, Crenitte, Lopes-Herrera & Hage, (2018) were in consensus with the results of this study. The authors found an effective correlation between metacognitive skills, working memory, and reading comprehension for students with learning difficulties aged eight to 12 years. Working memory was the only significant predictor of reading comprehension in comparison to selective attention and cognitive flexibility.

The relationship between emotional intelligence and selective attention did not indicate an effect for any of the predictive variables on reading comprehension. This result conforms to some research and contradicts with the others. A variability of results was found by Follmer (2017) since some studies indicated a positive correlation between selective attention and reading comprehension, while other studies revealed a non-significant correlation.

The results of the study by Parker (2021) are in consensus with this research. The author examined whether selective attention and self-regulation contribute to the variance in reading comprehension beyond word recognition and language comprehension. According to the results of the hierarchical multiple regression analyses and moderation effects tests, selective attention contributed a greater percentage of variance in reading comprehension for students with normal language histories than for students with language difficulties.

It is doubtful that low ability to select relevant information from irrelevant one will not hinder reading comprehension. It is plausible that in this specific sample, students have delays in the underlying skills of reading comprehension, such as low fluency rate and poor vocabulary level (Kendeou, McMaster, & Christ, 2016). In addition, reading comprehension scores might be affected by the nature of the test used because it does not include connected texts to choose from. The results of this research could be explained by the indirect effect of inhibitory control on reading comprehension through decoding and text recall/inference abilities (Ober Brooks, Plass, & Homer, 2019), because of the deficits in these two skills in children with learning difficulties. In this research, students with learning difficulties were not directly assessed for text recall, but the assessment results from the preview reports indicated difficulty in recalling events.

The results of the paired t-tests revealed that social emotional learning had a significant impact on emotional intelligence, working memory, and selective attention, regardless of the students' individual differences. The practical implication is that social emotional learning can be implemented with all levels of learning difficulties.

An indirect but noteworthy implication is the viability of social emotional learning interventions to improve self-advocacy and self-determination, as depicted in previous research (Kurdi, Joussemet & Mageau, 2021).

Although the findings do not support all the hypotheses, they provide evidence on the effect of social emotional learning on emotional intelligence and executive functions and the predictive effect of working memory on reading comprehension. The outcomes of this study have the potential to make teachers of students with learning difficulties conscious of the importance of social emotional learning skills and their contribution to students' success. In addition, results would foster collaboration between special education and general education teachers to advocate for the needs of their shared students and to incorporate social emotional learning programs into pedagogical practices.

6. Conclusion

The role of the relationship between emotional intelligence, working memory, and selective attention as executive functions skills on reading comprehension of students with learning difficulties in the Lebanese context can be considered negligible in the experiential research. This study draws on the research about the impact of social emotional learning on emotional intelligence and executive functions as an essential step to examine the effect of the predicted variables of emotional intelligence and working memory, and emotional intelligence and selective attention, on reading comprehension.

The main hypothetical contribution of this study has been the association between social emotional learning, emotional intelligence, and executive functions and the relevance of the implementation of these practices in inclusive classrooms. It verified that social emotional learning can improve emotional intelligence and executive functions and subsequently, that the

relationship between these two constructs might have an effect on reading comprehension for students with learning difficulties.

The findings add to our understanding of the potency of social emotional learning for students with learning difficulties in reducing the stigma imposed by the learning difficulty and equipping students with copying skills to better perceive their difficulties and improve self-efficacy. Integration of emotional intelligence training would help foster self-determination when students realize that they are the causal agents of their success.

Findings support the notion that the ability to identify emotional clues is allied with enhanced social skills, as students are more apt to interpret social clues and react in a more appropriate manner. Improved empathy might lead to more enjoyable friendships and enhanced social relations in school for students with learning difficulties (Magaldi & Park-Taylor, 2016). Integration of social emotional learning programs in the general education curriculum can be a tremendously practical way to enhance students' social skills and behaviors, and provide teachers with tools for classroom management. Also, training is important for students without learning difficulties since it would increase empathy for example, which is necessary to know how to interact with students with learning difficulties in the inclusive classroom (Bratitsis & Ziannas, 2015).

Social emotional learning was effective in improving working memory and selective attention of students with learning difficulties. Thus, social emotional learning can be employed as a training program to improve working memory and selective attention for students with learning difficulties as they play an important role in academic achievement. One conclusion is the relation between emotions and working memory. This assumption is supported in the study by Mikels & Reuter-Lorenz (2019) who found that working memory can regulate emotions, and feelings can be the mental images preserved by working memory. In the same vein, we can deduce that assessing working memory is essential to predict reading comprehension problems since it facilitates early recognition of learning difficulty indicators and promotes early intervention practices.

The emphasis of future research would be to delve more deeply into the role of social emotional learning in the education of students with and without learning difficulties in the Lebanese context. As a result, it is recommended that professional development programs include social emotional and emotional intelligence skills training for both regular and special education teachers in order to use them in intervention plans, as both are accountable for teaching in the inclusive classroom. Another aspect is to weave social emotional learning programs into the intervention plans; thus, the individualized education programs of students with learning difficulties should include objectives to investigate the effect of intervention when applied through all content areas. Parent training is necessary to raise awareness about their role in the growth of social emotional skills because home is the first place where children explore emotions in their daily interactions.

It is proposed to conduct a longitudinal study on the students of this research to examine how they generalize the use of the skills to cope in middle and secondary cycles, to know if they utilize social emotional learning and emotional intelligence skills to achieve better, and to investigate if they maintain their skills in the absence of systematic implementation of social emotional learning programs. Concurrent with this, long term intervention across scholastic years to improve emotional intelligence is necessary to maintain good emotional levels, as suggested in the study by Cantero et al. (2020).

In the same vein, the evidence from this study endorses the importance of revisiting the Lebanese Curriculum to include social emotional learning and emotional intelligence skills since they help children to cope with certain raising issues. For example, issues related to the economic situation that triggers family discord and begot unmet needs as a result of the parents' incapability to meet all the children's demands as a result of the devaluation of the national

currency are considered factors that affect performance and behavior in schools **(**Lyu, Li & Xie, 2019). Also, the COVID-19 outbreak and its aftermath on psychological well-being, and the lack of students' connectedness with their friends and relatives justify the significance of the incorporation of social emotional learning, and emotional intelligence skills into the curriculum.

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