


# The Effects of Mother-Child Mediated Learning Strategies on Cognitive Modifiability and Psychological Resilience of Children With Learning Disabilities: A Replication of Tzuriel and Shomron's Study (2018) With Nigerian Children

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## Abstract

This study determined the effects of mother-child mediated learning (MCML) strategies on the psychological resilience (PR) and cognitive modifiability (CM) of children with learning disabilities (LD) using a structural equation modeling (SEM) approach. The study utilized a sample of 60 mothers and 60 children with LD. These children were both male (63%) and female (37%) primary five level children diagnosed with LD and were sampled from inclusive primary schools in Enugu State, Nigeria. The mean age and standard deviation of the children was  $10.5 \pm 1.04$  years. Data collected were analyzed using a SEM approach. The findings of the study showed that (a) the causal model for the explanation of the effects of MCML on the PR and CM of pupils with LD significantly fitted in the observed causal model and (b) MCML had a significant effect on the PR as well as CM of children with LD. One implication of this study is that the PR, as well as the CM of children with LD, can be enhanced through MCML.

## Keywords

learning disabilities, mediated learning strategies, psychological resilience, cognitive modifiability

## Introduction

Learning Disabilities Association of Canada (2012) defined learning disabilities (LD) as disorders which may affect the acquisition, organization, retention, understanding, or use of verbal or nonverbal information. LD are conditions in which a child has a low ability to understand new information and study independently (National Institute for Health and Care Excellence [NIHCE], 2016). According to Orim and Uko (2017), LD are disorders that render the lowest abilities needed for human thinking in an individual. Every child acquires a requisite amount of genetic information from both parents which is different from other children with LD and is shaped by their environment and experiences as they grow up (NIHCE, 2016). Thus, a person with a particular genetic cause for their LD, such as Down's syndrome, is different from all other people experiencing the same problem.

However, there are common characteristics of disability which are needing additional support when at school, and reasonable adjustments to ensure good health and social care among people with LD (NIHCE, 2016). Children with LD who are in inclusive primary schools find it difficult associating with their peers as well as developing their cognitive ability because of their condition (Smith, 2004). There is a greater percentage of children with LD than adults because

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children need additional support at school concerning learning academic skills (Hatton et al., 2016; NIHCE, 2016). The prevalence of LD in Nigeria is 12 million out of which six million are children (Obani, 2006; Okoye, 2014). According to United States of America Centre for Learning Disability (2014), LD is more prevalent among males (2%) than females (1.3%). It is higher among those living in poverty (2.6%) than those living above the poverty line (1.5%). According to Margalit and Ankonina (1991), the management of LD depends on the knowledge of the difficulties associated with the parents' upbringing of a child with LD. Children with LD are found to need additional support at school to get the best chance to learn academic skills such as the development of their cognitive ability and psychological resilience (PR; NIHCE, 2016).

Cognitive modifiability (CM) and PR represent the individual's ability to adapt to new situations (Walsh, 2003). CM refers to structural changes, or changes in the state of the organism, brought about by a deliberated program of intervention (Tzuriel & Caspi, 2017). Structural changes refer not to isolated events but to the organism's manner of interacting with, that is, acting on and responding to, sources of information. A structural change, once set in motion, will determine the future course of an individual's development. PR is the ability to successfully cope with a crisis and to return to pre-crisis status quickly. PR is defined as "a dynamic process encompassing positive adaptation within the context of significant adversity" (Luthar et al., 2000, p. 543).

Resilience is a relative inner strength of individuals as well as any external protective processes provided by social systems such as family interactions concerning the impact of vulnerabilities (Smith, 2004; Wiener, 2003). Walsh (2003) found that resilience exists when the person uses mental processes and behaviors in promoting personal assets and protecting an individual from the potential negative effects of stressors. PR includes a positive adjustment in a complex situation (Luthar et al., 2000). According to Tzuriel and Shomron (2018), students' awareness and acceptance of their disability are parts of the ingredients for the development of PR. This knowledge of the various ways of fostering their PR can be made known to such children through mediation by the mother.

Based on the above premises, this study was carried out within the theoretical framework of the mediated learning experience (MLE) by Feuerstein et al. (2002).

## Theoretical Background

This study was anchored on the theory of MLE by Feuerstein, et al. (2002). MLE is a theory of intelligence which states that intelligence is rather modifiable but not fixed (Feuerstein et al., 2002). Feuerstein et al. (2002) believe that human beings have the innate ability to change or be modified in line with their cognitive functioning, meaning that human beings are seen as open systems, prone to change all their life spans and responsive to conditions of remediation through

appropriate intervention. According to Feuerstein et al. (2002),

intervention based on MLE aims at restoring a pattern of development and the improvement of the individual's quality of life as normal as possible, change the cognitive structure of the learner and to transform them into an autonomous, independent thinker, capable of initiating and elaborating ideas. (p. 5)

MLE explains a special quality of interaction between a learner and a person, and these interactions are considered the proximal factor that explains CM (Feuerstein et al., 2002). MLE interactions involve educators interposing themselves between a set of stimuli and the human organism and modify the stimuli for the developing child (Tzuriel, 2001). In this context, it is the responsibility of the mediator to find the right mediation process for every individual with LD to contribute to the process of intelligence modifiability (Feuerstein et al., 2002). The quantity and quality of mother-child interactions can influence many features of child development, including social, emotional, and cognitive ones (Vahidi et al., 2017). However, in this present world that is rapidly changing and demands that children need to acquire knowledge and many skills to be qualified individuals, many parents are concerned about their children's cognitive development (Vahidi et al., 2017).

This study is a replication of Tzuriel and Shomron's (2018) study with Nigerian children. It is based also on the MLE theory and is aimed at determining the effect of mother-child mediated learning (MCML) strategies on CM and PR of children with an LD. In the context of this study, the mother was the mediator in the MLE framework. Researchers have conceived parent(s) as agent(s) in improving the child's emotional, motivational, and cognitive development (Leigh, 2007; Tzuriel and Shomron, 2018). In other words, the mediation of a parent in the academic pursuit of their children, especially those with LD, goes a long way in their overall development. Tzuriel and Shomron (2018) found that the MLE processes are developed gradually by the child and become instruments for change in the future. In other words, MLE facilitates the development of various cognitive functions of learners. The effects of MCML on CM and PR of children with LD were determined using the structural equation modeling (SEM) as used by Tzuriel and Shomron (2018).

## SEM

According to Grace (2008), SEM is a multivariate statistic that is used for testing and understanding of complex relationships among variables. In SEM, a network of directional paths linking variables is used to represent complex interactions and then evaluated against multivariate data (Grace, 2008). The direct and indirect effects among variables as well as spurious associations between variables that may be attributed to common causes are represented by the path coefficients. SEM is a

statistical approach that provides causal associations between variables. SEM is a very general and powerful multivariate analysis technique that includes specialized versions of several other analysis methods as special cases.

According to Byrne (1994), the major applications of SEM included causal modeling, or path analysis, confirmatory factor analysis, second-order factor analysis, regression models, covariance structure models, and correlation structure models. This approach of multivariate analysis is different from other simple analysis like analysis of variance (ANOVA) and multiple regression analysis.

The advantages of SEM include allowing for designing of complex models with intermediate variables and latent constructs; allowing for inferring causal relations among variables without having to use experimental designs; and contributing to the understanding of the conceptual whole more than the sum of fragmentary separate analyses (Jeoreskog & Sorbom, 1986; Raykov et al., 1991). The justification for the use of SEM in this study was for the fact that the effects of several independent variables (mother-child mediated learning experience [MCMLE], home environment [HE], and mothers' attitude) were explored on the dependent variables (CM and PR).

SEM is the most appropriate statistical analysis for establishing multiple relationships among several variables. This statistical model has successfully been used by Tzuriel and Caspi (2017), Tzuriel and Shamir (2007), Tzuriel and Shamir (2010), Tzuriel and Shomron (2018), Tzuriel and Weitz (2008), Ugwuanyi and Okeke (2020), and Ene et al. (2021) in their separate studies. In this study, SEM was used to develop a causal model for the data set. Confirmatory factor index (CFI), chi-square goodness-of-fit test, and root mean square error of approximation (RMSEA) were used to test the model fit for the data.

## Review of Related Empirical Studies

A lot of studies have been conducted on the effect of mediated learning strategies in the cognitive development of children. Klein and Alony (1993) found that mothers exposed to mediation training captured and maintained children's attention to colors, shapes, animals, numbers, and so on during their daily interactions. Klein and Alony (1993) found that mother-child interactions improved their children's individual characteristics to consider their emotions and interests. Feuerstein and Falik (2010) found that mother-child mediated interactions increase the children's knowledge as they learn the fundamental logical thinking skills. MLE enables children to learn from their direct experiences with the environment and apply their skills in new situations (Klein, 2000). According to Pintrich (2002), mediated learning interactions that are in line with children's interests, needs, cognitive strengths, and challenges enhance children's motivation to learn. Mäntymaa (2006) found that a child's relationship with their mother results in all-round and optimal child development through the interaction of multiple factors and the dynamic

exchanges of biological structures. Slavin (2006) found that mother-child mediated interactions provide children with various situations where they can solve different cognitive problems and benefit from their mother's feedback.

Studies showed that peer mediation and mother-children interaction intervention was effective in improving MLE strategies (Adi Japha & Klein, 2009; Shamir et al., 2007; Tzuriel & Shamir, 2010). Peer mediation and mother-children interaction intervention effectively facilitated CM of children with LD (Shamir & Lazerovitz, 2007; Trabelsi et al., 2015; Tzuriel & Shamir, 2007, 2010).

Previous studies conducted with children without LD indicated that interventions for supporting mother-child interactions had a significant role in improving the mothers' MLE strategies, which in turn linked to children's cognitive performance/modifiability and PR in early and middle childhood (Tzuriel & Caspi, 2017; Vahidi et al., 2017). In the context of LD, researchers also argued that MLE strategies significantly predicted PR and CM of children with LD. However, none of the studies reviewed was conducted using Nigerian children with LD. Thus, this study developed a causal model for explanation of the effects of MCML experience on PR and CM of children with LD which is a replication of Tzuriel and Shomron's (2018) study with Nigerian children. The researchers, therefore, hypothesized that MLE strategies would have significant effects on the PR and CM of children with LD.

## Method

### Participants

The study sample comprised 60 primary five children with LD and 60 mothers of the children. These children were psychologically diagnosed of having LD and were drawn from inclusive classrooms in regular schools in Enugu State, Nigeria. The sample was made up of both male and female primary five children. The age range of the children was 9 to 11 years. A purposive sampling technique was used to draw the sample. Purposive sampling was adopted to ensure that each child had LD and a mother, as his or her partner, in the MLE mother-child interaction.

The ethical clearance for the conduct of this study was obtained by the authors from the Research Ethics Committee of the Faculty of Education, University of Nigeria. Before the actual study started, mothers of the children (those diagnosed psychologically to have an LD) were forwarded consent letters individually for them to indicate their willingness to participate in the study. Out of the 75 mothers who were sent letters, 60 indicated an interest in the study and were used for the study. The children also gave informed assent to indicate their willingness to participate in the study before the commencement of the study.

*Demographic characteristics of the participants.* Table 1 showed that there was a significant difference in the percentage of male and female pupils who took part in the study,  $\chi^2(60) = 41.243$ ,

$p = .000$ . There was a difference in the age of the children,  $\chi^2(60) = 32.367, p = .000$ . There was a significant difference in the age of the mothers,  $\chi^2(60) = 39.410, p = .000$ .

### Instruments

**Observation of Mediated Interaction (OMI).** The researchers adopted OMI developed by Klein (1996) for the study. According to Klein (1996), "OMI has five subscales which are: Intentionality and Reciprocity, Mediation for Meaning, Mediation for Transcendence, Mediation for Feelings of Competence, and Mediation for Self-Regulation" (p. 9). Intentionality and reciprocity represent an interaction which is based on ability of the mediator to create a state of vigilance in the child. This is done when the mediator focuses the child's attention on a specific aspect of learning activities. Mediation of meaning implies the interactions in which the mediator emphasizes the significance of an event by labeling such event as well as expressing interest on it. Mediation for transcendence involves going beyond the immediate needs of the child which can be achieved by looking out for far-reaching goals. Mediation of feelings of competence represents the mediator's verbal and nonverbal reward through the arrangement of the environment to ensure the children's success. Finally, mediation for self-regulation implies the management of the child's responses. Such management is dependent on the task demands. The mothers were observed independently on all the five strategies of MLE.

The interrater reliabilities of the MLE strategies were as follows: intentionality and reciprocity, .91; meaning, .90; transcendence, .95; feelings of competence, .93; and regulation of behavior, .92 (Tzuriel & Shomron, 2018, p. 8). The present researchers observed internal consistency reliability indices for the five strategies as .89, .92, .86, .87, and .83, respectively. These showed that the five strategies demonstrated good internal consistency reliabilities using Nigerian sample.

**Resilience Attitudes and Skills Profile (RASP).** RASP developed by Wolin and Wolin (1993) was adopted for the study to measure PR. RASP is an observational rating scale with options of *excellent* (5), *good* (4), *average* (3), *fair* (2), and *poor* (1). According to Wolin and Wolin (1993), "RASP is divided into seven criteria: insight, independence, creativity, humour, initiative, interpersonal relations, and moral values" (p. 3). Following the use of the RASP with children demonstrating low academic achievements and difficulties in school adaptation ( $n = 101$ ), some of the items were modified to suit the children's level of understanding (Hurtes & Allen, 2001). The modification reduced the original scale to 34 items after confirmatory factor analysis. Cronbach's alpha reliabilities of .49 to .71 for the different scales and an overall coefficient of .91 were estimated by Hurtes and Allen (2001). For this study, the overall internal consistency reliability of .83 was obtained for the RASP.

**Home Observation for Measurement of the Environment (HOME).** The HE was measured using HOME developed by Bradley et al. (1988) and adopted by the researchers. The instrument was designed to measure various aspects of social support, both emotional and cognitive, given to the primary five pupils in their homes. The measure is composed of five subscales: encouraging mature behavior, emotional climate, enhancing growth, active stimulation, and physical environment. The HOME was an observational rating scale of *excellent* (5), *good* (4), *average* (3), *fair* (2), and *poor* (1). The reported reliabilities of the HOME, based on a sample of typically developing children ( $n = 124$ ) at the age of 6 to 10 years, ranged in different subscales from .52 to .80. The reliability for the total scale was .91 (Bradley et al., 1988). The HOME was re-trial tested for this study because of the location of the study. The new reliability indices for the five subscales are .69, .72, .82, .84, and .86 with an overall reliability of .89.

**Mother's attitude toward child with LD scale (MATCLDS).** The mother's attitude (MA) toward the child with LD was examined using the MATCLDS developed by the researchers. The attitude scale was originally a 40-item instrument with four response options: strongly agree (SA), agree (A), disagree (D), and strongly disagree (SD). Examples of items of the instrument are *I hate communicating with my child with a learning disability; I avoid assisting my child with learning disability with homework*. The attitude scale was later subjected to construct validation through exploratory factor analysis using the principal component matrix. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.872, which shows that the sample size for the exploratory factor analysis of the MATCLDS was very adequate in this regard. Furthermore, Bartlett's test of sphericity was significant because the associated probability of 0.000 is less than 0.05. After the factor analysis, items were found to be factorially impure because they did not have factors loading up to 0.3 in any of the factors.

Similarly, eight items were found to be factorially complex because they had factor loadings of more than 0.3 in more than one factor, whereas 25 items had factor loadings up to 0.3 in only one of the factors. Thus, the attitude scale was a 25-item instrument.

The lowest score on MATCLDS is 25, whereas the highest score is 100. The internal consistency reliability of the items of MATCLDS was obtained as .736 using the Cronbach's alpha method. To determine the estimate of the temporal stability of the instrument, MATCLDS was readministered after a 2-week interval. The temporal stability reliability index of .821 was obtained using the Pearson product moment correlation.

**Cognitive Modifiability Battery (CMB).** CMB developed by Tzuriel (2000) was adopted for the study. CMB is a dynamic assessment (DA) instrument designed for kindergarteners to fourth graders which is composed of seven subtests, each



addressing different areas of cognitive functioning. CMB comprised four plates with nine windows ( $3 \times 3$  pattern) for each plate. It has removable wooden squares that cover the windows, thereby creating different patterns of open windows for different tasks. The test includes also 64 wooden blocks (in red, green, blue, and yellow), which are placed in the windows to create the problems of the different subtests, and square cardboard with schematic pictures of the windows. The number of plates and the number of windows used vary for the different subtests. To solve the problem, the child has to mentally rotate the plate according to the progressively varying positions and place it in the correct windows. The Cronbach's alpha reliability coefficients for the preteaching and post-teaching phases, respectively, were as follows: seriation, .62 and .64; reproduction of patterns, .91 and .94; analogies, .84 and .77; Sequences I, .88 and .90; Sequences II, .69 and .67; and mental rotation, .63 and .70.

### Procedure

The interactions between mothers and children were based on the theory of MLE. Before the commencement of the interaction, the pupils were pretested based on their PR and CM using the appropriate instruments. After that, the researchers trained the mothers used for the study on the basic assumptions of the MLE framework and thereafter allowed each of the mothers to teach her child. Every subset of the interaction group was made to understand that the study aimed to determine how mothers and children learn together. The mediation program was carried out in the school environment. It was programmed in such a way that it did not clash with the normal school activities. Thus, after school time was used for the mediation program.

Careful observations of the whole interactions were made for a period of 30 min for each contact. There were two contacts in a week for a period of 12 weeks. The mothers, during the interactions, were allowed to perform the task of impacting cognitive and resilience skills in their children. At the end of the interaction, the pupils were also post-tested by administering the instruments for measuring PR and CM. The HOME and MATCLDS were administered to the mothers before and after the mediation. Thus, an aggregate score of the two measures was used for the analysis.

Despite that both pretest and post-test were obtained for the study, the pretest and post-test scores from all the instruments used for the study were aggregated and used for the analysis to satisfy the assumption of SEM approach adopted for the analysis of the data.

### Method of Data Analysis

The data generated were analyzed using a SEM approach. The SEM approach was done using Analysis of Moment Structures (AMOS) version 16.0. The data collected for PR, CM, HE, and MA were at ordinal level but were all

converted to interval scale after coding to achieve the assumption of SEM. The conversion was done through the aggregation of the respective ratings for each of the respondents. SEM was used to develop a causal model for the data set. CFI, chi-square goodness-of-fit test, and RMSEA were used to test the model fit for the data. The mediating effect of MCML on the indirect effects of the HE and the MA toward children with LD was tested using the Sobel test.

### Results

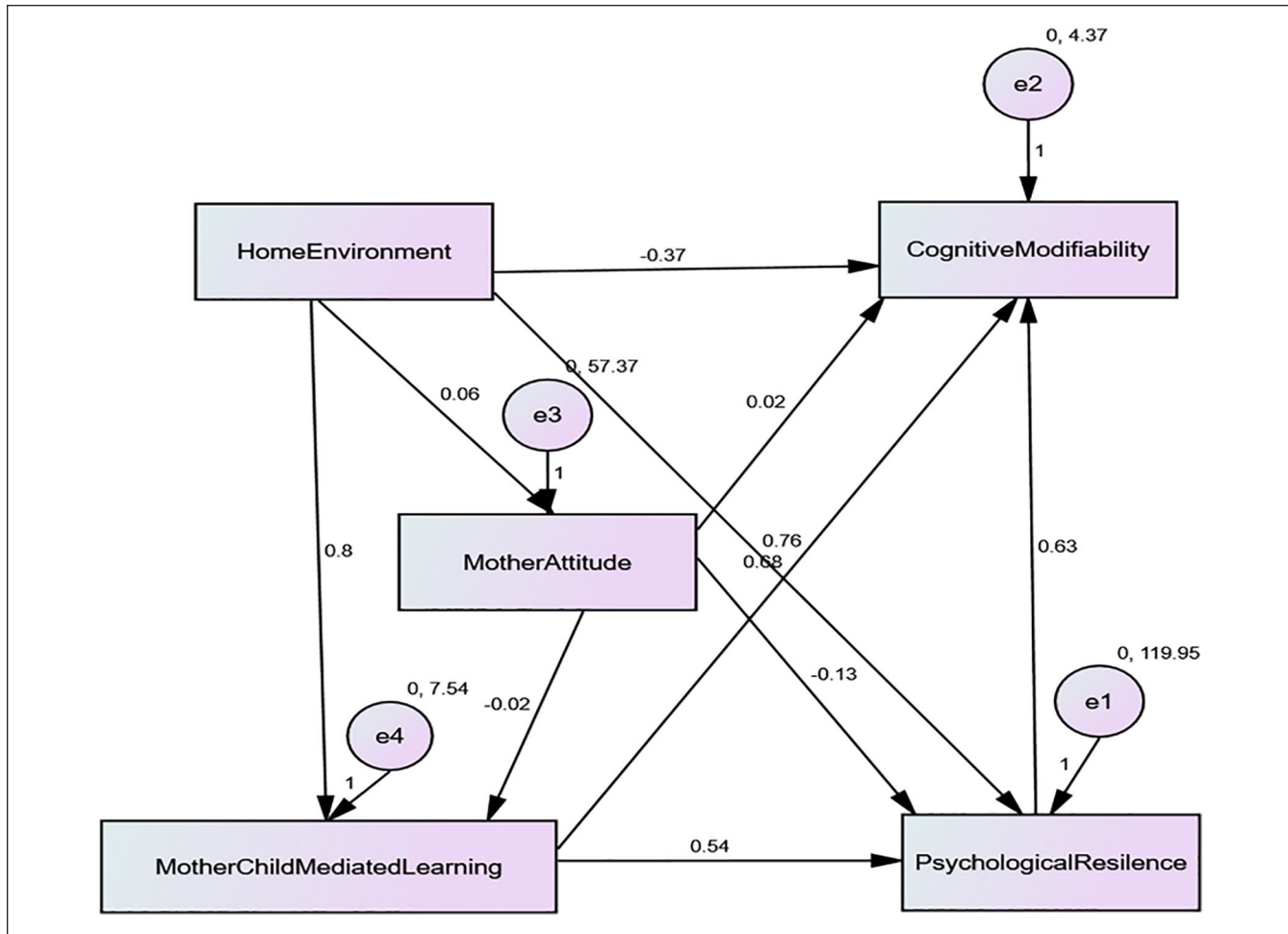
Figure 1 shows the causal model for the interrelationships among the exogenous and endogenous variables for the study. The main endogenous variables for the study are the PR and CM, though the figure shows that mother attitude and MCML are endogenous variables to the HE. The figure shows the significant paths and those that are not significant among the variables. For the model fit indices for the causal model, it was revealed that the default  $\chi^2 = 127.623$ ;  $df = 54$ ;  $p < .050$ ;  $RMSEA = .047$ ;  $CFI = .953$ . The goodness-of-fit indices for this model supported an adequate model fit, in that the CFI value was higher than .90 and the RMSEA value was less than .05. In other words, the observed causal model fitted the theoretical model.

Figure 1 and Table 2 show that MCML had a significant path coefficient with PR,  $\beta(60) = .54$ ,  $p < .050$ . The HE had a significant path coefficient with PR,  $\beta(60) = .76$ ,  $p < .050$ . HE had a significant path coefficient with MCML instruction,  $\beta(60) = .80$ ,  $p < .050$ . MCML had a significant path coefficient with CM,  $\beta(60) = .68$ ,  $p < .050$ . However, mother attitude had no significant path coefficient with PR,  $\beta(60) = -.13$ ,  $p = .486$ . Mother attitude had no significant path coefficient with CM,  $\beta(60) = .02$ ,  $p = .652$ . It is worthy to note that PR had a positive correlation with CM with a significant path coefficient,  $\beta(60) = .63$ ,  $p < .050$ . This showed that the two dependent variables for the study are positively related.

Furthermore, the Sobel test was conducted to test for the significant indirect effects of HE and MA on PR as mediated by MCML. The result showed that MCML significantly mediated the indirect effect of HE on the PR of children with LD,  $\beta(60) = .80$ ,  $p < .050$ ,  $t = 12.705$ ,  $p < .050$ . However, MCML had no significant mediating effect on the indirect effect of MA on PR of children with LD,  $\beta(60) = -.13$ ,  $p = .486$ ,  $t = 1.085$ ,  $p = .683$ .

### Discussion

This study's findings revealed that MCML strategies significantly predicted the PR and CM of children with LD. MCML significantly mediated the indirect effect of HE on the PR of children with LD but did not mediate that of MAs. Besides, PR and CM of children with LD which were the outcome variables for the study were significantly predicted directly by the HE. However, mothers' attitudes toward children with



**Figure 1.** Causal model for the impact of mother-child mediated learning instruction on PR and CM.  
 Note. PR = psychological resilience; CM = cognitive modifiability.

LD had no significant prediction of outcome variables. On the contrary, the findings of the study of Tzuriel and Shomron (2018) which was replicated by this study revealed that the outcome variables were significantly predicted by MCML, HE, and MAs toward children with LD. This indicated that there is variation in the prediction of outcome variables by the HE and MAs between Tzuriel and Shomron's study and this study. While Tzuriel and Shomron (2018) found a significant prediction of outcome variables by HE and MAs toward children with LD, this study found a significant prediction of outcome variables by only HE but not MAs. This variation in the aspect of the influence of the MAs can be attributed to the cultural difference between the two studies. In the Nigerian context, children do not have right to behave any how they like implying that they are bound to be punished whenever they misbehave. This condition normally makes some Nigerian children afraid of their parents, most especially mothers, when they commit punishable offense. In order words, some Nigerian mothers exhibit hostile behavior on their children, especially the ones with LD. This situation varies from the context of Tzuriel and Shomron's

study in which boy children may have not been treated like the Nigerian children. Thus, these cultural differences in the raising of the children in the two different contexts may have accounted for the disparity in the findings.

Second, the study that was replicated used only boys as study participants, whereas this study used both boys and girls with LD. The gender issue disparity in the two studies may have led to the observed variation in the findings as it pertains to the MA. The replicated study used both male and female children, whereas Tzuriel and Shomron's (2018) used only male children. The nature of the interaction between mother and male children may vary from that for mother and female children. In the Nigerian context, female children listen very better to their mothers, whereas male children listen better when the fathers talk. This Nigerian peculiarity may not obtain for the context of Tzuriel and Shomron's study thereby leading to the observed disparity in the findings.

Buttressing the finds of this study, Feuerstein and Falik (2010) found that mother-child mediated interactions increase the children's knowledge as they learn the fundamental logical thinking skills. MLE enables children to learn

**Table 1.** Demographic Characteristics of the Participants.

Percentage of participants by gender				
	Male	Female	df	$\chi^2$
Frequency	38	22	1	41.243***
Percentage	63	37		
Participant age				
	9 years	10 years	11 years	
Frequency	15	27	18	2
Percentage	25	45	30	
Percentage of mothers by age				
	22–30 years	31–40 years	41 years and older	
Frequency	28	21	11	2
Percentage	47	35	18	
Mean age of participants	10.05 ± 1.04			

\*\* $p < .01$ . \*\*\* $p < .001$ .

**Table 2.** Estimates of the Regression Weights of the Independent Variables on the Dependent Variables.

Variables	Estimate	SE	CR	$p$ value
Mother attitude <--- Home environment	.06	.24	0.26	.793
Mother-child mediated learning <--- Home environment	.80	.09	9.15	***
Mother-child mediated learning <--- Mother attitude	-.02	.05	-0.50	.618
Psychological resilience <--- Mother attitude	-.13	.19	-0.70	.486
Psychological resilience <--- Home environment	.76	.54	1.41	.018
Psychological resilience <--- Mother-child mediated learning	.54	.52	1.05	.296
Cognitive modifiability <--- Home environment	-.37	.11	-3.53	***
Cognitive modifiability <--- Mother-child mediated learning	.68	.10	6.83	***
Cognitive modifiability <--- Mother attitude	.02	.04	0.45	.652
Cognitive modifiability <--- Psychological resilience	.63	.06	7.01	.196

Note. CR = critical ratio.

\*\* $p < .01$ . \*\*\* $p < .001$ .

from their direct experiences with the environment and apply their skills in new situations (Klein, 2000). According to Pintrich (2002), mediated learning interactions that are in line with children's interests, needs, cognitive strengths, and challenges enhance children's motivation to learn. Mäntymaa (2006) found that a child's relationship with their mother results in all-round and optimal child development through the interaction of multiple factors and the dynamic exchanges of biological structures. Slavin (2006) found that mother-child mediated interactions provide children with various situations where they can solve different cognitive problems and benefit from their mother's feedback.

MLEs significantly enhanced children's metacognition (Adi Japha & Klein, 2009). Shamir et al. (2007) and Tzuriel and Shamir (2010) found that peer mediation and mother-children interaction intervention was effective in improving MLE strategies. Such intervention also improved

the MLE strategies of children with LD (Shamir & Lazerovitz, 2007; Trabelsi et al., 2015). Peer mediation and mother-children interaction intervention effectively facilitated children with LD' CM (Tzuriel & Shamir, 2007, 2010; Trabelsi et al., 2015). Esterhuizen and Grosser (2014) found that mediated learning intervention with a sample of Grade R learners enhanced cognitive functions that benefited the application of cognitive and metacognitive skills, and that eliminated motivational-affective factors that can influence learning and achievement.

Tzuriel and Caspi (2017) found that peer mediation and mother-child interaction had significant effects on children's MLE strategies and CM. Vahidi et al. (2017) found that parent-child interactions had a significant effect on preschool children's cognitive performance. Tzuriel and Shomron (2018) found that mother-child MLE strategies significantly predicted PR and CM of children with LD.

The results of this study imply that MCML is effective in improving the PR and CM of children with LD. These results strengthened the researchers' expectations of the effectiveness of MLE instruction. Feuerstein et al. (1978) opined that MLE provides the organism with instruments of adaptation by making learning more efficient and modified. Besides, adequate MLE interactions facilitate the development of various cognitive functions and need systems of children (Feuerstein et al., 2002). The practical implication of these findings is that the PR, as well as the CM of the children with LD, can be enhanced through mother-child mediated interactions.

These findings have a theoretical implication on the MLE theory which postulates that adequate mediation during children's learning creates a conducive environment for cognitive development. The findings of this study have therefore strengthened the tenets of MLE theory by hypothesizing that adequate MLE strategies help children with an LD to develop PR skills as well as CM. The researchers, therefore, recommend that MCML strategies should be used in assisting the children with an LD to improve their PR and CM.

## Conclusion

The outcome of the study revealed that the MCML strategy significantly predicted PR and CM of children with LD. Thus, the PR and CM of children with LD largely depend on MCML. The MCML, in particular, is an effective mechanism of improving the PR and CM of children with LD. Thus, MCML should be adopted especially in inclusive classrooms to enable children with LD to cope with their conditions in the course of their cognitive development.

## Limitations of the Study

The data used for the analysis were aggregated scores obtained at pretest and post-test assessment. Thus, the lack of pretest–post-test differences for the outcomes is the main limitation to the generalizability of the findings of the study. Furthermore, some of the mothers who participated in the study were not literate at the time of the research. Despite that, efforts were made to control that it may have affected the generalizability of the findings of the study.

## Suggestions for Further Research

The researchers suggested that future researchers can adopt a different approach to the analysis of the data that will allow for the estimation of pretest–post-test differences for the outcomes. Also, adequate training of mothers for the implementation of MCML should be carried out to replicate this study.

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