The Effects of a Psycholinguistic Approach to Multisensory Instruction on Psycholinguistic Abilities of Children with Learning Disabilities

Вплив психолінгвістичного підходу до мультисенсорного навчання на психолінгвістичні здібності дітей з обмеженими можливостями навчання

Loul Saleh Al Rasheed
Full professor
E-mail: loul1984@yahoo.com
https://orcid.org/0000-0003-0708-7420

Qassim University,
College of Education
(Kingdom of Saudi Arabia)
P.O.Box 6688, Qassim,
Al Qaseem, Saudi Arabia

ABSTRACT

Purpose. Learning Disability (LD) is an important field in which the differences between individuals are clear, and the differences within the individual are the most, so children with LD form a heterogeneous society. The aim was to investigate the effects of a psycholinguistic approach to multisensory instruction on psycholinguistic abilities of children with learning disabilities.

Methods. This study seeks to provide an answer to the question on what is the effects of a psycholinguistic approach to multisensory instruction on psycholinguistic abilities of children with learning disabilities. A sample of 40 students in grade 3 with LD
in three primary schools in Buraydah – Qassim, KSA was invited to be participants in the study. Criteria of inclusion were as follows: (1) demonstrating low achievement scores according to teacher’s reference (i.e., at least 1.5 [SD] below their same age people, though their normal levels of intellectual functioning, (2) the absence of any neurological or motor disorders, (3) Low score on Illinois Test of Psycholinguistic Abilities – Third Edition. The research used the quasi-experimental approach due to its suitability to the nature of the research, which relies on the experimental design based on two groups, one experimental and the other control, and by using the pre- and post testing of the two groups.

**Results.** Results indicated increased psycholinguistic abilities of children with LD. This indicates the effectiveness of the psycholinguistic approach to multisensory instruction in improving psycholinguistic abilities of children with LD.

**Conclusions.** The psycholinguistic approach to multisensory instruction is one of the training methods that are carried out by employing several sensory channels in the process of training the reading skill, and this method is based on training the child to link the sound and the written symbol by hearing the sound and seeing the symbol or symbols at the same time touching or tracing this symbol and noticing the shape it takes In writing, and in these methods, the child is asked to draw, copy and write the letter and at the same time pronounce the sound indicating it, and thus not relying only on the visual image or the auditory memory alone in learning to read. The results from this study contribute to the growing literature on the effect of the psycholinguistic approach to multisensory instruction in improving psycholinguistic abilities of children with learning disabilities. The present study lends empirical support to the notion that psycholinguistic abilities of children with learning disabilities can be improved through the psycholinguistic approach to multisensory instruction.

**Key words:** psycholinguistic approach, multisensory instruction, psycholinguistic abilities, learning disabilities.

**Introduction**

Learning Disability (LD) is an important field in which the differences between individuals are clear, and the differences within the individual are the most, so children with LD form a heterogeneous society (Hoogendoorn, 2021). They represent a category of groups that are included in the field of special education. Despite this, it is considered the largest of these categories, and the most attractive to many scholars and researchers in various fields (Benkohila, Elhoweris & Efthymiou, 2020), as it includes more than half of the children who receive special education services.
There are two types of learning disabilities: Developmental learning disabilities, which are the deviation in the development of a number of psychological and linguistic functions that seem normal during the stages of a child’s development (Khalik, 2014; Said, 2014). These difficulties are often associated with lack of academic achievement, and include attention difficulties, cognitive difficulties (Eissa & Mostafa, 2013) memory difficulties as primary difficulties, and difficulties in thinking and language, as secondary difficulties arising from the primary difficulties (Mohammed, Sherit & Eissa, 2013).

Kirk and Chalfant (1984) presented a threefold classification of developmental learning difficulties that includes three basic types: cognitive difficulties, language difficulties, and visual-motor difficulties. The second type represents academic learning difficulties, which refer to a clear disturbance in learning to read, write, spell or arithmetic (ElAdl, 2020; Mostafa 2013). A child is considered to have academic learning difficulties if he/she has a significant difference between his mental abilities and his/her academic achievement in one or more of the previous fields (Gomaa, 2016).

While the child enrolls in primary education and shows a latent ability to learn but fails to do so after providing appropriate school education, then it is taken into account that the child has a special difficulty in learning to read, write or arithmetic (Huseini & Abdullah, 2014), and hence it is important to identify these cases until early intervention is made to prevent secondary problems, but it is often waited until this group of children reaches the primary stage (Nassar, 2019).

The problems or difficulties of attention, cognition, and memory as developmental disabilities come at the forefront of what children with LD are exposed to from various and different problems that represent the basis upon which they are exposed to LD (Elhoweris, 2017), and what they suffer from as a consequence and as a result of that. The child’s academic disabilities in reading or writing may be due to a disturbance in the ability to synthesize sounds (Mostafa, 2017), and collect them in one word (Eissa, 2014) in the case of RD (Eissa, 2015), or to a disturbance in visual memory (Eissa, 2014) in the case of writing disabilities. This means that the developmental LD represented by poor phonemic synthesis, or poor visual memory; as a result, the child suffers from LD in reading or writing (Banna, 2019). That is, the relationship
between them is a cause-effect relationship, as developmental disabilities can be considered a source of later academic disabilities and the main reason for their occurrence.

The reason for LD can be due to disorder in psychological processes, and this is logically acceptable, as we cannot accept the emergence of a deficit in one of the academic fields except as a result of a deficiency in some or all of the cognitive processes such as (Ismail, Mohamed & Soltan, 2019): attention, perception, memory and thinking. Therefore, the treatment of the difficulty lies in training in these basic psychological processes (Sofologi et al., 2022).

The diagnosis and treatment of students with LD, according to the theory of disorders in psychological processes, depends on renewing the strengths and weaknesses of the student more than focusing and searching for causes (Sofologi et al., 2022). Supporters of training in psychological processes assume that the processes involved in learning topics can be identified, then children are trained on them to improve processes themselves, assuming that training in these processes will increase the breadth of academic skills acquisition (Eissa, 2018; Haft et al., 2019).

What emerged in the framework of this theory were cognitive-motor training programs aimed at developing perceptual-motor abilities, developing basic preparations for learning, and cognitive and academic abilities (Tomlinson, 2001). The most famous of these programs are: Kephart Program, Getman and Kan Program, and Frostig Program (Fisher, Murray & Bundy, 1991). One of the most important applications that relied on the previous approaches is the multi-sensory strategy, in which more than one sense is used for learning (Bernacchio & Mullen, 2007). This strategy assumes the student’s need to use all sensory methods in the learning process. Eissa (2020) points out that the most important types of remedial intervention that have been agreed upon globally to alleviate the effects of dyslexia is teaching based on the basics of language and the use of multiple senses (Martin, Gaffan & Williams, 1998). Although the majority of studies that dealt with the learning process focused on a single sensory input, the experiences that we encounter in our daily lives require us to use more than one sense, for example, visual and audio information are interconnected to perform many different tasks, and therefore the human mind has evolve to grow, work and learn better in multisensory environments (Eissa &
Al Huseini, 2013; Mostafa, 2018); therefore, multi-sensory learning and training methods are more appropriate to the conditions of students in general and those with learning difficulties in particular (Theresia & Recard, 2021).

**Psycholinguistic Abilities**

Psycholinguistics is a field that emerged and took its name through the marriage between linguistics on the one hand and psychology on the other hand (Menn, 2017). It is outside its scope, and if some see that the function of language is to express thought, then – based on that – language can be considered as a field of study of Psychology of Language (Traxler, 2012).

Psycholinguistics is a field that emerged and took its name through the marriage between linguistics on the one hand and psychology on the other hand (Menn, 2017). It is outside its scope, and if some see that the function of language is to express thought, then – based on that – language can be considered as a field of study of Psychology of Language (Traxler, 2012).

Psychology of Language is defined as a study of the psychological processes that a person acquires and implements through the natural language system, and deals with the nature of language, describing it and an objective recipe, and defining the concept of psychological processes associated with language and the means of its study (Traxler, 2012). It focuses on the cognitive processes involved in the normal use of language, and it is concerned with the social rules involved in the use of language and the mental mechanisms associated with it (Menn, 2017).

Psychology of Language is defined as a study of the psychological processes that a person acquires and implements through the natural language system, and deals with the nature of language, describing it and an objective recipe, and defining the concept of psychological processes associated with language and the means of its study (Traxler, 2012). It focuses on the cognitive processes involved in the normal use of language, and it is concerned with the social rules involved in the use of language and the mental mechanisms associated with it (Menn, 2017).

Psychology of Language is defined as a study of the psychological processes that a person acquires and implements through the natural language system, and deals with the nature of language, describing it and an objective recipe, and defining the concept of psychological processes associated with language and the means of its study (Traxler, 2012). It focuses on the cognitive processes involved in the normal use of language, and it is concerned with the social rules involved in the use of language and the mental mechanisms associated with it (Menn, 2017).

Language has two main aspects, the first of which is receptive language, which is the individual’s ability to hear, understand and implement language without pronouncing it, that is, it is the individual’s ability to understand what is said to him, and the basic skills for success in this process are listening, and the other is called expressive language, which is the Spoken, written language and sign language (Steinberg & Sciarini, 2010). It manifests in an individual’s ability to speak and write language. As for expressive language, it includes the set of skills responsible for transforming ideas into phonetic linguistic symbols, and here the message is verbal, or it is converted into visual symbols and the message is in this way written (Field, 2004). Expressive language problems are represented in the weak ability to use long, complex or abstract sentences, poor use of correct phrases, words and grammar, and poor ability to follow the topic and choose the correct words (Traxler, 2012).

Psycho-linguistic models are the most widespread and used in detecting – in the early stages of life – the differences within the individual, and the differences between individuals in the psychological
functions through which the individual transmits his thoughts and feelings (verbal or non-verbal) to another individual, and through which the stimuli of the external environment are also received and interpreted (Menn, 2017).

And after the Illinois test model, the psycholinguistic abilities are one of the most famous integrated tests that reveal differences within the individual, and between individuals in the early stages of life for diagnostic, classification and treatment purposes (Steinberg & Sciarini, 2010). The diagnosis and treatment of children with LD – according to the theory of psychological processes – depends on identifying the strengths and weaknesses of the child more than focusing and searching for causes (Traxler, 2012). Frostge et al. 1966 considers that identifying and training children who have disability in visual perception during the pre-school years (Field, 2004), or when they attend school, helps prevent many aspects of school failure and mismatch resulting from visual perception disabilities (Eissa, 2018).

**Multisensory Instruction**

Children differ among themselves in terms of the sensory channels that they use or rely on in the learning process (Hood, 2017). Some of them learn better if information is provided to them through the auditory channel, and others learn better through the visual channel, where the appropriate teaching aids are in the drawings and pictures. There is another category called holistic learners, who are the years who depend on both the audio-visual channel for learning (Sadler-Smith, 1996). This category of individuals has a high ability to learn through different sensory channels such as the sense of touch, sight, hearing and sense of movement.

The human being has five sensory inputs that he uses to receive and perceive the information received from him from the surrounding environment, and he also uses this information in the learning process of all kinds and forms, including the process of learning to read and write (Marosan et al., 2022). Linking three sensory inputs, especially the sense of sight, hearing, and touch – the sense of movement in the process of learning to read and write (Malčík & Miklosikova, 2016). Inputs into the learning process, and despite the differences between specialists and researchers in explaining the nature of the psychological mechanisms and processes that are carried out according to this
method to improve reading skill, they agree on the usefulness of this type of training in overcoming or alleviating the problem of dyslexia (Marosan et al., 2022).

The variety of stimuli that address the learner’s different senses lead to attracting attention towards the thing to be learned and for him to be able to identify it quickly. These stimuli can be called cues (Pritchard, 2009). There are also various cues methods, including audio, which is related to sounds, music and audio effects, including visual, which is everything related to visual things such as colors, movement, lines, arrows, visual effects, etc. (Singer, 2010), and learning concepts requires the use of visual and non-visual cues to direct the attention of the learner to the common property of the concept he is learning (Schunk, 2012).

**Problem Statement**

Learning disability is among the important problems that students face in the basic education stage. That is why many researchers and specialists are interested in studying it with the aim of identifying its causes, trying to diagnose students who suffer from it, and to providing appropriate training and treatment programs.

Accordingly, the problem of the current research can be formulated in the following main question: *What is the effects of a psycholinguistic approach to multisensory instruction on psycholinguistic abilities of children with learning disabilities?*

**Purpose**

The aim was to investigate the effects of a psycholinguistic approach to multisensory instruction on psycholinguistic abilities of children with learning disabilities.

**Hypotheses**

1. Experimental group students will outperform the control group students on Spoken Analogies subtest in post test.
2. Experimental group students will outperform the control group students on Spoken Vocabulary subtest in post test.
3. Experimental group students will outperform the control group students on Sound Deletion subtest in post test.
4. Experimental group students will outperform the control group students on Sight Decoding subtest in post test.
Method

This study seeks to provide an answer to the question on what is the effects of a psycholinguistic approach to multisensory instruction on psycholinguistic abilities of children with learning disabilities. Data were collected from students during the second term in the academic year 2021–2022.

Participants

A sample of 40 students in grade 3 with LD in three primary schools in Buraydah – Qassim, KSA was invited to be participants in the study.

Criteria of inclusion were as follows:

1. demonstrating low achievement scores according to teacher’s reference (i.e., at least 1.5 [SD] below their same age people (Eissa, 2018: 109), though their normal levels of intellectual functioning (Eissa, 2012);

2. the absence of any neurological or motor disorders;

3. Low score on Illinois Test of Psycholinguistic Abilities—Third Edition. The sample was randomly divided into two groups; experimental (n=20 girls, 50%) and control (n=20 girls, 50%). The two groups were matched on age, IQ, and Psycholinguistic Abilities score. All t-values did not reach significance level. This indicated that the two groups did not differ in age, IQ, and Psycholinguistic Abilities (pre-test).

Research Model

The research used the quasi-experimental approach due to its suitability to the nature of the research, which relies on the experimental design based on two groups, one experimental and the other control, and by using the pre- and post testing of the two groups (see fig. 1).
Data Collection Instrument

The Illinois Test of Psycho linguistic Abilities—Third Edition (Hammill, Mather & Roberts, 2001) is an individually administered, norm-referenced test of spoken and written linguistic abilities. The author made some modifications to the original version of the test to be a short form to suit the Arabic environment in one hand and to be easy to be administered to the sample of this study on the other hand.

This modified short version includes:

1. Spoken Analogies (15 items);
2. Spoken Vocabulary (15 items);
3. Sound Deletion (10 items);
4. Sight Decoding (15 items);
5. Sound Decoding (15 items);
6. Sight Spelling (10 items);
7. Sound Spelling (10 items).

Reliability analysis using Cronbach’s Alpha showed that the test used in this research was reliable as shown in Table 1.

The content validity of the test was examined by a group of 10 experts. They assessed the relevance of each item using a four-point Likert scale (where 1 represents “irrelevant” and 4 represents “highly relevant”). They provided suggestions and comments. The 90 items were judged to be quite or highly relevant. A content validity index was calculated at the item level (I-CVI = 0.90).
Table 1
Reliability Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach’s Alpha Based on Standardized Items</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spoken Analogies</td>
<td>0.87</td>
<td>Reliable</td>
</tr>
<tr>
<td>Spoken Vocabulary</td>
<td>0.89</td>
<td>Reliable</td>
</tr>
<tr>
<td>Sound Deletion</td>
<td>0.83</td>
<td>Reliable</td>
</tr>
<tr>
<td>Sight Decoding</td>
<td>0.82</td>
<td>Reliable</td>
</tr>
<tr>
<td>Sound Decoding</td>
<td>0.80</td>
<td>Reliable</td>
</tr>
<tr>
<td>Sight Spelling</td>
<td>0.85</td>
<td>Reliable</td>
</tr>
<tr>
<td>Sound Spelling</td>
<td>0.86</td>
<td>Reliable</td>
</tr>
<tr>
<td>The whole scale</td>
<td>0.91</td>
<td>Reliable</td>
</tr>
</tbody>
</table>

Procedures

The instruction is based on psycholinguistic approach in teaching reading skills. The psycholinguistic multisensory approach is based on the assumption that pupils learn best if information is presented to them through sensory channels (auditory, visual, tactile, and kinaesthetic). This approach is represented in: phonemic awareness (in which the student learns that words consist of a group of letters and syllables and each has specific sounds), the connection between sound and symbol (here the student learns how to link between letter, its death), letter shape recognition (by recognizing letters at different locations in words spoken and written), syllable pronunciation (in which the pupil is taught that words can be divided into groups of syllables), reading short sentences (in which the pupil is encouraged on reading simple sentences from simple words).

The instruction using the multi-sensory strategy depends on the use of the different senses of the child in order to train him in basic psychological processes (attention, perception – memory). This method of training may be seen as a separate method, but it is often categorized within the entrances of the crepe on psychological processes, as a method of intervention with students with LD in general, and those with reading disabilities in particular.

The entrance to training on basic psychological processes is one of the approaches to teaching and learning that works on employing the audio-visual abilities of children through imagination, audio-visual visualization and the formation of mental perceptions,
through a group of girls and using many audio-visual media such as the use of music, songs, verbal similarities, pictures and drawings, and pictorial similarities, and visual arts activities such as drawing, coloring, installation, and formation.

The author could create a psychological atmosphere for students by transferring them to be positive participators and interact with the training sessions, taking into account the focus on the type of audio-visual stimulus presented to the student as well as the method of presentation, the time required to present the stimuli, the tools used for that and the way to deal with the student.

The instruction using the multi-sensory strategy in the current research consisted of (26) training sessions, with the aim of improving and developing the processes of attention and audio-visual perception and their sub-skills, in addition to the tasks of audio-visual memory. Each activity is presented in light of: its objective, the tools used in each activity, the time period for implementing the activity, in addition to the steps for implementing and evaluating the activity.

Organizing the content of the training sessions so that it takes into account the characteristics of the sample and the individual differences that may exist between them, and the way it is presented to the students in the light of the attention and audio-visual perception stimuli included in the program, taking into account the gradation from simple to complex and from easy to difficult.

A number of techniques were used in order to complete this instruction and achieve its objectives, which are: explanation and repetition, modeling, verbal guidance, material and moral support, feedback, homework, and correcting mistakes first-hand so that the student does not believe that his answers are correct, although they may be incorrect.

The instruction is based on a set of activities consisting of groups of mazes, pictures, shapes, symbols, words, pictures and audio stories in addition to the use of some devices and laboratory tests (such as the wooden disk experiment).

The instruction also took into account the enforcement of the correct responses, through continuous encouragement and material and symbolic rewards, which increase the student’s motivation and responses and continue to receive the sessions, and the instruction achieves its objectives.
**Data Analysis**

Invalid questionnaires, including those that were incomplete or provided the same response for all items or with many missing values, were eliminated. The effects of a psycholinguistic approach to multisensory instruction on psycholinguistic abilities were assessed using pre-post testing design.

**Results**

**Hypotheses Testing**

To compare whether there is a difference in the dependent variable for the two independent groups, the T-test was used. Table 2 shows that (T) values were as follows: Spoken Analogies ($t=8.432$, $P < 0.01$), Spoken Vocabulary ($t=7.263$, $P < 0.01$), Sound Deletion ($t=9.112$, $P < 0.01$), Sight Decoding ($t=9.231$, $P < 0.01$), Sound Decoding ($t=9.001$, $P < 0.01$), Sight Spelling ($t=9.052$, $P < 0.01$), Sound Spelling ($t=9.005$, $P < 0.01$), and the total score ($t=15.684$, $P < 0.01$). These values are significant at the level (0.01) in the favor of experimental group (see Fig. 2).

**Table 2**

*T-Values Results for the Differences in Post-test Mean Scores Between the Two Groups on Psycholinguistic Abilities*

<table>
<thead>
<tr>
<th>Sub-scales</th>
<th>Groups</th>
<th>N</th>
<th>Mean</th>
<th>Std. deviation</th>
<th>t-test</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spoken Analogies</td>
<td>Experimental</td>
<td>20</td>
<td>10.3</td>
<td>1.02</td>
<td>8.432</td>
<td>$P &lt; 0.01$</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>20</td>
<td>6.32</td>
<td>2.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spoken Vocabulary</td>
<td>Experimental</td>
<td>20</td>
<td>11.11</td>
<td>1.33</td>
<td>7.263</td>
<td>$P &lt; 0.01$</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>20</td>
<td>7.02</td>
<td>2.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sound Deletion</td>
<td>Experimental</td>
<td>20</td>
<td>8.56</td>
<td>1.71</td>
<td>9.112</td>
<td>$P &lt; 0.01$</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>20</td>
<td>4.44</td>
<td>2.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sight Decoding</td>
<td>Experimental</td>
<td>20</td>
<td>12.44</td>
<td>1.70</td>
<td>9.231</td>
<td>$P &lt; 0.01$</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>20</td>
<td>6.67</td>
<td>2.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sound Decoding</td>
<td>Experimental</td>
<td>20</td>
<td>12.01</td>
<td>1.88</td>
<td>9.001</td>
<td>$P &lt; 0.01$</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>20</td>
<td>6.23</td>
<td>2.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sight Spelling</td>
<td>Experimental</td>
<td>20</td>
<td>8.25</td>
<td>1.77</td>
<td>9.052</td>
<td>$P &lt; 0.01$</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>20</td>
<td>4.76</td>
<td>2.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sound Spelling</td>
<td>Experimental</td>
<td>20</td>
<td>8.32</td>
<td>1.79</td>
<td>9.005</td>
<td>$P &lt; 0.01$</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>20</td>
<td>4.65</td>
<td>2.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total score</td>
<td>Experimental</td>
<td>20</td>
<td>70.99</td>
<td>2.31</td>
<td>15.684</td>
<td>$P &lt; 0.01$</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>20</td>
<td>40.09</td>
<td>4.56</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The aim was to investigate the effects of a psycholinguistic approach to multisensory instruction on psycholinguistic abilities of children with learning disabilities. Results indicated increased psycholinguistic abilities of children with LD. This indicates the effectiveness of the psycholinguistic approach to multisensory instruction in improving psycholinguistic abilities of children with LD. These results go in the same line with previous research (Joshi, Dahlgren & Boulware-Gooden, 2002; Mehrabi, Zarbakhsh & Rahmani, 2014; Nourbakhsh, 2014; Soliman & Feras, 2017; Şule & Çiğdem, 2018) which indicates the effectiveness of training programs based on the multi-sensory strategy conducted in improving the basic psychological processes of attention, cognition and memory. This was reflected positively in alleviating their academic disabilities. This indicates the relationship of influence and vulnerability between developmental learning disabilities and academic learning disabilities.

The results of the effectiveness of the psycholinguistic approach to multisensory instruction in improving the psycholinguistic abilities
of students with LD can be interpreted in light of the nature and foundations of the psycholinguistic approach and the techniques that were used, which included a variety of activities used in it to cover the audiovisual attention processes and their sub-skills, and the two processes Audio-visual perception and their sub-skills, and audio-visual memory processes, taking into account the relationship between sensory inputs (multiple senses: hearing and sight, touch and movement), and motor outputs during continuous and regular training sessions and the overlap between its components.

In addition to focusing on the repetition of training on these activities and continuous encouragement and support until mastery using different girls, which was represented in modeling, feedback and active participation. This resulted in stimulating, activating and stimulating the different sense and perception systems and their various skills, organization and arrangement among the members of the experimental group; And then reorganizing the cognitive and psychomotor functions of the brain, which appeared in the improvement of the performance of these students on the dyslexia diagnosis test, in addition to reducing their emotional tension while they gain self-confidence.

The experiences and activities that he presented in e psycholinguistic approach to multisensory instruction effectively contributed to the student’s senses and readings, which helped to master them and pay attention to them. This was reflected positively in improving the ability to listen to auditory attention, such as training in choosing the stimulus presented visually and audibly, paying attention to it, and receiving information by integrating the senses of hearing and seeing, and developing the ability to link the auditory stimulus (the audible sounds of words) and the visual stimulus (looking and seeing the written letters that make up the words).

In addition to developing listening skills in general, which is the first skill of language skills and the performance on the Illinois Test of Psycholinguistic Abilities. It also led to the development of auditory and visual perception skills, as students were trained in how to distinguish auditory sounds and words, and auditory closure of words, in addition to hearing discrimination between shape and ground. In addition to exercises of auditory sequence memory, and so on for visual perception and its sub-skills with focus here on the sense of sight.
This result can also be explained in the light of the psycholinguistic approach to multisensory instruction, with its diversity and richness. It focused on strengthening when the child makes any progress. This resulted in the ability of the students to organize their psychological environment, including the cognitive stimuli that focused on the audio-visual aspect. This led to an improvement in the ability of these children processing and processing the information presented to them in an audio-visual perceptual manner.

**Conclusion and Recommendations**

The results from this study contribute to the growing literature on the effect of the psycholinguistic approach to multisensory instruction in improving psycholinguistic abilities of children with learning disabilities. The present study lends empirical support to the notion that psycholinguistic abilities of children with learning disabilities can be improved through the psycholinguistic approach to multisensory instruction.

The psycholinguistic approach to multisensory instruction is one of the training methods that are carried out by employing several sensory channels in the process of training the reading skill, and this method is based on training the child to link the sound and the written symbol by hearing the sound and seeing the symbol or symbols at the same time touching or tracing this symbol and noticing the shape it takes. In writing, and in these methods, the child is asked to draw, copy and write the letter and at the same time pronounce the sound indicating it, and thus not relying only on the visual image or the auditory memory alone in learning to read.

The sense of movement while touching the letter enhances the link between the visual and auditory image of this letter, which helps children with special disabilities in reading letters, such as reversing letters while reading or writing (b/d), for example, to correctly identify letters.

Hence, it is necessary to pay attention to language through psycho-linguistic exercises, as language has gained its great importance due to the disturbances in communication in different degrees and forms caused by any defect in one of its elements. This has resulted in the interest of most developed countries in studying psycholinguistic abilities.
in terms of measuring and developing them, and that supplementing or correcting these abilities is vital in raising children, especially in early childhood. It results in disruption in basic psychological processes, and students’ learning disabilities.

Acknowledgements. The author wishes to thank the children for their participation.

ADHERENCE TO ETHICAL STANDARDS

Ethics Declarations. The study was conducted according to the guidelines of the Declaration of Helsinki (1964).

Data availability statement. The datasets generated during and/or analyzed during the current study are available from the Mendeley Data: https://data.mendeley.com/datasets/5d6kffbmtw/1

Funding. The author received no funding.

Conflict of Interest. The author declares no conflict of interest.

Author contribution. The author is the only person that contributed to all parts of this paper.

Consent for Publication. The author approve of this submission and, conditional upon the decision made by the editorial board from the peer-review process, consent to the publication of the current work. The work has not been submitted to other journals in consideration for publication.

References


Hood, R. (2017). *Using the multisensory approach of touch math to teach basic mathematical operations to students with significant disabilities*. Theses and Dissertations. 544. URL: https://rdw.rowan.edu/etd/544


The Effects of a Psycholinguistic Approach to Multisensory...
Вплив психолінгвістичного підходу до мультисенсорного навчання

оцінками вчителів (тобто, щонайменше на 1,5 [SD] нижче, ніж у однолітків) при нормальному рівні інтелектуального функціонування, (2) відсутність будь-яких неврологічних або рухових розладів, (3) низький бал за Іллінойським тестом психолінгвістичних здібностей – третє видання. У дослідженні використовувався квазі-експериментальний підхід через його відповідність характеру дослідження, який ґрунтується на експериментальному дизайні, заснованому на двох групах, одна з яких експериментальна, а інша – контрольна, та на використанні пре- та пост-тестування обох груп.

Результати. Результати свідчать про підвищення психолінгвістичних здібностей дітей із порушеннями научуваності. Це свідчить про ефективність психолінгвістичного підходу до мультисенсорного навчання у покращенні психолінгвістичних здібностей дітей обмеженими можливостями навчання.

Висновки. Психолінгвістичний підхід до мультисенсорного навчання є одним із методів навчання, який здійснюється шляхом задіяння кількох сенсорних каналів у процесі формування навичкичитання; цей метод ґрунтується на навчанні дитини пов’язувати звук і письмовий символ, чути звук і споглядати символ або символи, одночасно торкаючись або обводячи цей символ і помічаючи, якої форми він набуває на письмі. Суть цього методу полягає в тому, що дитині пропонується намалювати, скопіювати і написати букву й одночасно вимовити звук, що її позначає, не покладаючись тільки на зоровий образ або тільки на слухову пам’ять при навчанні читанню. Результати цього дослідження сприяють збагаченню літератури про вплив психолінгвістичного підходу до мультисенсорного навчання на поліпшення психолінгвістичних здібностей дітей з порушеннями научуваності. Дане дослідження надає емпіричну підтримку ідеї про те, що психолінгвістичні здібності дітей з обмеженими можливостями навчання можуть бути покращені за допомогою психолінгвістичного підходу до мультисенсорного навчання.

Ключові слова: психолінгвістичний підхід, мультисенсорне навчання, психолінгвістичні здібності, труднощі у навчанні.