

## The Effect of Training Based on Operant Conditioning regarding the Writing Abilities and Motivation of Students with Learning Disorder, ages 12 to 16 in Saudi Arabia: A Case Study

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**Data availability.** The data pertaining to this study are available from the author upon reasonable request.

أثر التدريب المبني على الإشارات الفعال في القدرات الكتابية والدافعية لدى  
الطلاب ذوي صعوبات التعلم الذين تتراوح أعمارهم بين 12 إلى 16 سنة في  
المملكة العربية السعودية: دراسة حالة

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### Abstract:

It could be hard for students with specific learning disorder (SLD) to learn how to write on their own. Therefore, this research aims to use operant conditioning to teach students with learning disabilities to write and raise their motivation to learn. The method of the research is the single subject design. The writing skill will be measured continuously through the research. Moreover, environment, sample and motivation will be measured and described in detail. The participants are four female native Arabic speaking students: two of them are in grade 9 and the other two in grade 7. The training program lasted for one academic term, with 5-7 sessions for each student. The aims of the sessions are to help students with SLD to write without any help and to increase their motivation. Students' performance in general and their motivation to learn were improved during the experiment. However, the performance of each of them differed, as some students improved more than others. Applications and implications are discussed. The recommendation of the research is to provide assistance to students with learning difficulties, through studies on operant conditioning, and combining operant conditioning with other behavioral methods.

**Key words:** Reinforcers, Operant conditioning, specific learning disorder (SLD), Dysgraphia, Motivation, Single subject design.

### الملخص:

قد يكون من الصعب على الطلاب الذين يعانون من اضطراب صعوبات التعلم تعلم كيفية الكتابة بمفردهم. ولذلك يهدف هذا البحث إلى استخدام الإشارات الإجرائي، لتعليم الطلاب ذوي صعوبات التعلم الكتابة ورفع دافعيتهم للتعلم. طريقة البحث هي تصميم الحالة الواحدة. سيتم قياس مهارة الكتابة بشكل مستمر خلال البحث، وسيتم قياس وضبط البيئة والعينة والدافعية ووصفها بالتفصيل في البحث. المشاركون هم أربع طالبات من الناطقين باللغة العربية: اثنتان منهن في الصف التاسع واثنتان في الصف السابع. واستمر البرنامج التدريبي لمدة فصل دراسي واحد، مع 5-7 جلسات لكل طالبة. تهدف الجلسات إلى مساعدة الطلاب الذين يعانون من صعوبات التعلم على الكتابة دون أي مساعدة وتحفيزهم. النتائج أظهرت تحسناً في أداء الطلاب بشكل عام وتحسن دافعيتهم للتعلم خلال التجربة، باختلاف أداء كل منهن. حيث تحسنت بعض الطالبات أكثر من غيرهن. سيتم ذكر التطبيقات والآثار في البحث. توصي الباحثة بتقديم المساعدة للطلاب الذين يعانون من صعوبات التعلم، من خلال عمل أبحاث أكثر تتضمن الإشارات الإجرائي وعلاقته بطلاب صعوبات التعلم، والجمع بين الإشارات الإجرائي والأساليب السلوكية الأخرى.

## Introduction:

Specific learning disorder (SLD), as the name implies, is diagnosed when there are specific deficits in an individual's ability to perceive or process information efficiently and accurately. This neurodevelopmental disorder first manifests during the years of formal schooling and is characterized by persistent and impairing difficulties with learning foundational academic skills in reading, writing, and/or math. Specific learning disorder may occur in individuals identified as intellectually gifted and manifest only when the learning demands or assessment procedures (timed tests) pose barriers that cannot be overcome by their innate intelligence and compensatory strategies (American Psychiatric Association, 2022). Learning disability, also referred to as specific learning disorder, does not include learning problems that are attributable to sensory disorders, emotional disturbance, intellectual disabilities...., cultural or economic disadvantages. Nowadays, learning disabilities account for as much as 50% of all students receiving special education (Namkung, and Peng, 2018, Grigorenko, et al, 2020). Learning difficulties are common, and the prevalence of learning disability is increasing by 1% per year (Gregory, 2006, Jabeen, et al, 2021).

Dysgraphia is a learning disorder in which an individual's writing skills are below the level expected for his or her age and cognitive level. The DSM-5 dysgraphia no longer exists as a separate category but falls under the category of specific learning disorder. Dysgraphia may be isolated or may co-occur with other learning disorders, including dyslexia. Depending on the variables studied and the definitions utilized, between 30-47% of children with writing problems also have reading problems (Chung, and Patel, 2015, Knight, 2018). Dysgraphia is a specific learning difficulty characterized by problems when recognizing letters, syllables or phrases accurately and fluently as well as misspelling an orthographic writing (Intriago, et al, 2021). Dysgraphia can present with different symptoms at different ages, and it is poorly understood and is often undiagnosed. It has a high rate of co-morbidity with other learning and psychiatric disorders. The diagnosis and treatment of dysgraphia and specific learning disorders typically centers around the educational system (Chung, et al, 2020). Therefore if they need help they would learn on their own, it could be a struggle because of the lack of programs that could help them study writing independently. Since the causes of dysgraphia are unknown, the rapid detection of symptoms is very important. In academic and clinical uses, the most common tool for detecting dysgraphia is an evaluation of the quality of writing on paper sheets, a writing analysis is based on rules for scoring the writing quality (Dimauro, et al, 2020).

The research problem is that students with SLD don't have the ability to write easily as their classmates, and it definitely worries them and makes them unmotivated to study. There are many people suffering from learning disorders. Between 10% and 30% of children experience difficulty in writing (Chung, et al, 2020). Furthermore, when they ask for help, they don't have many options because most of the solutions are related to help from others. Thus, if they want to learn by themselves, they couldn't, so the solution probably is operant conditioning along with reinforcement in order to have the ability to learn and be motivated. This research aims to answer the following questions:

Can a training program based on operant Conditioning help SLD students to write?

Is operant conditioning capable of improving motivation to learn for students with SLD?

The significance of the study is to give the SLD students a solution to write without help from others, and to give the teachers a new solution to assist them. When the students feel that their work is going somewhere and they are improving they feel reinforced and pleased so that they may start trying more, working harder and ultimately they begin like studying \*. This research implemented the training program with operant conditioning through reinforcing the students with SLD to avoid deleting the wrong words so that they can correct them by themselves. In doing so, they feel joyful each time they get closer to the correct form and start writing the right letters even if the whole word isn't right. Hence, they will improve each time they try. The teachers also can follow the research instructions and motivate such students if they want to use operant conditioning.

B.F. Skinner (1938, Staddon, and Cerutti, 2002) have coined the term operant conditioning; which roughly means changing of behaviour through the use of reinforcement ..... given after the desired response is conveyed. Skinner identified three types of responses or operant that can follow behaviour, which are neutral operant, reinforcers and punishers. Further, there are two kinds of reinforcement: positive reinforcement and negative reinforcement. Positive reinforcement is when a behaviour gets rewarded by giving pleasant rewards to get the same behaviour. On the other hands, negative reinforcement is removing unpleasant reinforcer (Mcleod, 2015, George, 2019). To some extent, there is no fundamentally effective way for students with SLD to write and remember words by themselves, solutions always lie within outside help. Most students with SLD work with a specially trained teacher. The students should replace erasing the wrong words with just modifying them, so that they feel they haven't made mistakes in writing. Thus, they will be reinforced ..... to continue writing and their writing will improve because they are practicing it and because they have been reinforced. Students with learning disabilities and/or low achievement are enabled to develop a more positive attitude toward writing. This outcome appears to increase their interest in the task and, therefore, improve motivation (García, and Caso, 2016, Minoofam, et al, 2022).

Reinforcement could be one of the best solutions to help students to learn as one of the previous research projects showed. (Adibsereshki, et al, 2014, Minoofam, et al, 2022) Using reinforcement strategies could be an effective way to both address specific behavioural issues and motivation. The current study showed that using positive reinforcement (tangible and social reinforcements) in the classrooms for students with intellectual disabilities had a positive effect on their academic progress. So, if the researcher tried to use it in the right way with students with SLD through operant conditioning it could actually be the solution for them to learn by themselves (Richardson and Richardson, 2023). Operant Conditioning may be a useful tool in the classroom to help teachers manage students who conduct themselves in undesirable ways. The rewards and punishment system are very effective in getting the outcomes

that are wanted. The researcher aims to utilize it with students that suffer from SLD. Research focused on children training trained adults and adolescent. That's why the researcher is working on this research to help adults and adolescents ... learn how to write by themselves and children can benefit from it, too.

### Methodology

Research Method: The single subject design is used in this research. Single subject design is a type of research methodology characterized by repeated assessment of a particular phenomenon (often a behaviour) over time and is generally used to evaluate interventions. Repeated measurement across time differentiates single subject research design from case studies and group designs as it facilitates the examination of client change in response to an intervention (Coffee, 2011, Garbacz, and Kratochwill, 2020). The writing skill will be measure continuously through the research. This method has been used because it is difficult to make experiment with a large sample in this case. The environment, sample, and motivation will be measured and described in detail.

### Sample:

The sample will be from a special school for teaching students' with disorders. The name of the school is Academic City. The sample will be 4 female students only. With the consent of the parents, they were informed that their children are volunteers and that the research is not related to their school work. Students were given small gifts for their participation. All procedures were approved by the IRB at King Saud University.

#### general data

Diagnosis	chronic diseases	academic level	The social status of the family	Age	The student letter
Learning disability	None	Grade 9	The students father passed away; the condition of the family is relatively stable.	16	Student A
Learning disability	Diabetes	Grade 7	The mother and father are married, but the family's situation is unstable.	14	Student B
Learning disability and Learning impairment	None	Grade 7	The mother and father are separated.	12	Student C
Learning disability	None	Grade 9	The mother and father aren't separated and the family situation is stable.	15	Student D

#### Description of the study sample:

##### Description of the student A

The student's personality is friendly, but she gets bored easily and she did not like to study, even though she is very smart and a good writer. If the researcher didn't do what the student wanted, she usually gets mad but never disrespects the researcher as she is a polite student. She asked the researcher a lot to go back to the classroom but even if the researcher said no, she never left by herself. The student has many skills, but she needed more detailed explanation so that she can understand when the researcher asked her to do anything, or even when explaining the importance of the research. The student needed high motivation in order to complete the writing task most of the time, and the researcher needed to use material encouragement (gifts) in order to keep the student on the same motivation.

##### Description of the student B

The student is cheerful and has the ability to learn. She fidgeted a little, but she quickly returned to focus. Although her writing was good, her self-confidence was very low. She expressed her low confidence with negative terms about her writing. The student liked the researcher and stayed with her most of the time during the break. The student did not need material encouragement (gifts) in order to complete the writing task. The student got motivated if she wrote correct sentences.

##### Description of the student C

The student is very quiet, but she expresses her joy clearly. Most of the time the student did not get tired or bored from writing and studying. She seemed to be responsible and interested in the lessons she learned. She was easily reinforced, but her confidence was very low, as she needed reinforcement after each letter she wrote. She needed to make sure that what she wrote was correct, in the first session she told the researcher that she messed up letter as if she was warning the researcher that she wasn't good at writing. But in general, the student has the motivation to learn, but it doesn't appear clearly because of her fear of making mistakes. The student was diagnosed with Learning impairment in her old primary school, the diagnosis was modified when she was in the middle school in her new school. This is the first year for the student in the Academic City School. The student was suffering from bullying in her old school, and she didn't get the attention she needs from the teachers. They didn't teach her well in the previous school because the teachers used to say that the student was unable to learn, but after moving to the new school, the student showed a remarkable improvement. The researcher believes that it is due to the teachers' effort with the student.

##### Description of the student D

The student doesn't talk much, but she responded to instructions quickly and she was interested in learning. She did not clearly fidget, but the researcher could tell when the student is bored. She tried even if she was bored. She trusted herself and her writing but sometimes hesitated. If she was not in a good mood, it could be clearly seen in her performance. The researcher gave gifts to the student, not because she needed material

reinforcement, but because the student was in the same class with student A. Therefore, the researcher didn't want the student to feel inferior and that she did not receive gifts like her classmate, although her classmate needed gifts in order to be reinforced for writing, but student D did not need material reinforcement.

**Significance of the research:**

The significance of the research is to give the SLD students a solution to write without help from others and to give the teachers a new solution to help them. When students feel that their work is getting better they feel reinforced, and they start trying more. The researcher will do that through operant conditioning and reinforcing them.

**Materials:**

The researcher used the learning disorder scale from the school, so she didn't need to measure the learning disorder of the students again, because they were diagnosed before. The motivation part was measured through the student's reactions to learn, the phrases they describe themselves with and their desire to learn. The researcher recorded the reactions of the students in terms of learning during the sessions and the phrases they used to say about themselves and their writings. Then, she compared the phrases in the last sessions with the first sessions in order to know the development. Their writings were measured by a scale prepared by the researcher. The types of writing errors were chosen because of Al Mahri study (2020) which was conducted on sixth-grade students close to the age of this research sample. The researcher, Al Mahri, measured the writing difficulties the students suffered from which are: adding a letter, omit a letter, switch a letter and phonetic typing errors etc. The researcher will use the same book to read for the students so they will practice writing. The book will be Sherlock Holmes because it's easy to write and they will find it interesting as it's subtle for adolescents.

**Procedures:**

Writing was taught to the students, and the researcher used operant conditioning: students were reinforced by affirmative speech and they were reinforced on their own when they write them correctly, so they liked writing and had the motivation to write.

Wrong words didn't get erased or crossed out but rather modified. The researcher reads one page for the students and ask them to write it. The researcher didn't look at the paper until they finished it so they didn't get effected by the researcher's reactions. They shouldn't be asked to hurry up as they took their time. The researcher asked the student to read the first sentence and try to take out the wrong words. The researcher also didn't indicate wrong words or any other words that could frustrate the students. The researcher showed the word to be corrected or changed. If the students knew the wrong words the researcher will ask them to correct them . If they didn't know the researcher would tell them and will ask them to correct them and then reinforce them. If the students deleted a letter the researcher would try to give them time to think and if they knew they would get reinforced and they would add the letter. If they didn't know the researcher would tell them were to add the letter and reinforce them for writing it. If they added a wrong letter to the word they would be asked if there is something wrong

with the words. If they did know they would colour ... it or to hide it if it was not fixable. If another letter was forgotten they could erase it if it was erasable. If they didn't know the researcher will help them and reinforce them after they write it. If they switched letters, they would do the same thing except they would try to correct the wrong letter and turn it to the right without deleting it. If they couldn't, they would colour it and add it next to the right letter. The researcher will do this with the students until the page is done. Students writing and their motivation to achieve was measured throughout the experiment. The experiment was for 8 sessions. The writing practice time took 30-45 minutes, and it took more time ...when the students needed it.

How the researcher will measure during the research

Operant conditioning will be measured through the students' progress if they become better at writing. It means that operant conditioning is working. For the motivation part, motivation will be measured through the statements that the students say during the sessions. All positive and negative statements will be written down. During the sessions, the researcher will ask about the students' feelings about writing and studying. The researcher made a scale to measure the writing improvement.

The sessions started with the following:

- The researcher introduced herself to the students to earn their trust and she explained the research to them and how it will help them and others.
- Then the researcher asked them to introduce themselves and share their interests, and answer their questions on the research if they asked. Then, the researcher will take some information for the case study.
- The researcher read for the students from the book after discussing it with them and didn't look until they are done with writing.
- The researcher asked them if there is a mistake in the first sentence. If there wasn't, the researcher would not ask them and just reinforce them. But, if there was one, she would ask them, if they knew she would ask them to correct it and then reinforce them. If they didn't know, she would help them and ask them to correct it and then reinforce them line by line until they finish the paper. If they had more time from the 45 or the 30 minutes they would go to the next page, if they didn't, she would reinforce them.
- The researcher measured the writing mistakes after the students left immediately, but the notes were taken through the experiment so she wouldn't forget anything.

The students will read the first sentence or as much as they can. And then, they will try to write what they just read. And then they will modify the words that need modifications through the book they have. They aren't supposed to say any frustrating



words about their writing, but rather, to be proud of themselves and motivate themselves after modifying every letter or word. And they will do that until they finish the page.

### **Results:**

This section reviews the results that were reached and answer the research questions for each student.

### **Student A**

In the first session, the student showed lots of confidence and she wrote in a great way although she didn't show that much of interest in the significance of the research. She asked the researcher to go back to the class multiple times, and she fidgeted a lot. The student likes school, but she doesn't like the idea of studying. She prefers playing with the stuff around her and usually the researcher feels like the student isn't concentrating. Yet her writing performance is exceptional, and overall, she is the best writing student but just if she wants to write.

During the first session, the student wrote well without fidgeting until she finished half of the page, but after that, she felt bored and didn't want to finish the page. Therefore, the researcher tried to reinforce her to write, and she motivated her a lot, and the student continued to write when the researcher reinforced her. After she finished, the researcher asked the student to check if there were words that needed modification in the first line, but she answered all the questions that they don't need anything even when she knows there is a mistake. However, the researcher helped her by extracting the wrong words that needed modifications and motivated the student after completing the modification of each word. (Note: The researcher at that time did not know that the student, because of the low motivation to learn, did not say that there are mistakes and did not try to fix them, but rather, said that all of them were correct, because she did not want to learn). The student was strongly insisting that she would return to the class. The student has the ability to learn, but she doesn't want to learn, so the researcher reduced the number of words that the student will write in the next sessions, and started to increase the number of words in the sessions with time because the student has accepted the writing. The researcher gave the student gifts in some sessions in order to increase her desire to learn, although this may affect the reason for the reinforcement of the student. The reason for her acceptance of writing may not be because she is writing better, but rather, for the sake of the gift. The researcher did not find a better solution other than reinforcing with gifts, and indeed the student's response was excellent, and she no longer asked to return to class that much.

In the second session, the student was reinforced by the gift, so she was writing better, and the student smiled and felt happy when the researcher reinforced her verbally. The researcher did not reinforce the student with gifts except in some sessions only and with one gift, so the main reinforcement is correct writing.

In the third session, the student was full of energy, but she did not want to write. Rather, she wanted to play and talk to the researcher about the stories that happened to her, so she needed a double effort from the researcher to finish the session.

In the fourth session, it was divided into two parts. After the session began, the researcher stopped the session because the student had an important test. After the test, the student completed the session. She was not in a good mood and did not want to write. The researcher believes that the reason is due to the test.

In the fifth session, the student did a wonderful job, and was making a great effort. She did not try to evade writing as much as usual. She was trying to remember the lessons she learned, otherwise the student asked the researcher to draw in the half of the session, so the researcher allowed her then to continue writing. (Note: the researcher presented a gift to the student at the beginning of the session).

In the sixth session, the student's performance was normal, as usual, but she had a cold. In the seventh and final session, the student's performance was good, and she was making an effort during the session. She did not ask to return to class, not once, and she finished writing faster than usual, and she did not complain much. This indicates the high ability of the student to write and learn, and she did not complain as usual. This may indicate a high motivation of the student to write and she is no longer fidgeting like before, although she still shows some manifestations of fidgeting, but less than before.

Table A

Average number of errors for student A calculated by dividing number of errors by the number of written words.

The written errors							
type of error	Day 7	Day 6	Day 5	Day 4	Day 3	Day 2	Day 1
adding a letter	0.111	0.029	0.0344	0.148	0.333	0.388	0.179
omit a letter	0	0.117	0.0344	0.074	1.208	0.194	0.256
switch a letter	0.037	0.088	0	0.111	0.458	0.194	0.025
phonetic typing errors	0	0.029	0	0	0.291	0	0.025
Average	0.037	0.065	0.0172	0.083	0.572	1.194	0.1212

The results and figures in the table A showed the student's development in writing and the impact of operant conditioning on her writing. The student has become better at writing, but due to the lack of sessions the researcher was unable to intensify the training (Note: the lack of sessions is due to the presence of vacation in the middle of the experiment and the student's continuous absence), nevertheless, the student showed improvement in writing and she remembered some of the lessons she learned in the sessions, she was no longer fidgeting like previous times, which could be a sign of

motivation for learning. The data in Table A showed that there are more errors in average than usual on the second day, the researcher doesn't know way exactly. The student showed improvement during the sessions in terms of motivation to learn and in terms of writing.

### **Student B**

In the first session, the student entered very quietly, but after about half an hour, she became very talkative and full of energy. When the researcher explained to the student the importance of the research, the student showed a lot of interest and was asking about the details of the research. Before the student wrote, she said, "I am not good at writing, and my older brother always gets surprised because of the way I write." She was disparaging her writing, and this showed the researcher the student's lack of motivation to write. But at the end of the session, the student began to repeat a lot. "I am shocked, this is the first time that I write in such a good way." The researcher believes that the improvement of the student's writing, is due to the continuous reinforcement. The researcher convinced the student that she writes well and that she doesn't make mistakes, but she needs to modify only some words.

The second session, the researcher noticed that the student likes to draw attention to herself, as she complains a lot that she is tired or sick, and she did this in the previous session, but in general the student was feeling proud while writing and after the reinforcement. She said that it is a miracle that she is writing correctly, but if the student doesn't know how to write one of the words, she hastens to become tense and worried, as well she said about herself "I am stupid, my brain thinks stupidly". The researcher tried to deny these thoughts and motivate her. Although the researcher noticed the student's satisfaction and that she is writing more confidently. And she told the researcher that she feels that writing is a fun and challenging game, and asked the researcher not to help her. This was great progress, as the student became aware of her success. The researcher persuaded the student to stop calling herself stupid and tell herself that she is smart and that she writes everything correctly, as she only needs to modify some words.

In the third session, the student entered smiling, and she started talking immediately. She was happy that the researcher came. She didn't want to leave the class after completing the experiment. She wanted to stay with the researcher, and she wanted to practice writing more. The researcher motivated the student and told her that she is improving a lot in writing, and the student was proud, and she said "I am shocked that I can write". And she added that "I think that my mother is praying for me, so I became smarter".

In the fourth session, the student entered the classroom excited and became happy when she saw the researcher. And when the student was writing, she said that she was shocked by her writing and smiled, she was happy with her improvement. The student performed well. She remembered the previous lessons and did not repeat the same mistakes. The student insisted that she stay with the researcher during the break, and she did not want

to leave, so she sat with the researcher drawing during the break. She was very happy at the end of the experiment and proud of herself. She repeated the phrase she said in the previous session “I think my mother is praying for me, so I am doing a good job”.

In the fifth and final session, the student entered the class in a very low mood, as one of the students bullied her yesterday, and the student’s mother intervened and the problem was solved, but as time progressed in the session the student improved, the student issued positive responses despite her psychological state, so she was laughing and playing and wrote everything she had to do. She stayed with the researcher during the break. The student didn't do extra work that day, as usual, and this is due to her feeling of frustration. The researcher tried to talk with the student, listen to her, and give her the attention she needs so that the student can overcome these negative feelings. Overall, the student's performance that day was good.

Table B

Average number of errors for student B calculated by dividing number of errors by the number of written words.

The written errors					
type of errors	Day 5	Day 4	Day 3	Day 2	Day 1
adding a letter	0.129	0.048	0.098	0.18	0.102
omit a letter	0.012	0.064	0.058	0.16	0.163
switch a letter	0.116	0.225	0.039	0.28	0.061
phonetic typing errors	0.012	0	0	0.02	0.081
Average	0.067	0.084	0.048	0.16	0.101

Student's overall performance in writing improved. On the last day, the student was not happy and did not want to write because of some bullying from one of the students. The researcher couldn't intensify the sessions with the student because of the student's continuous absence, and the experiment was also interrupted for a period of time due to the vacation. At the end of the sessions, the student asked the researcher for the book that the researcher used to read to her in the experiment, it seems that this indicates a high motivation for learning among the student and that could be a sign of the effect of operant conditioning on the student motivation. In addition, the student's expressions in the last sessions were completely different from before, as she described herself in better ways than before, and said that she was shocked by the progress and that this was the first time she wrote in such a good way. Additionally, if this indicates anything, then it is evidence of a rise and improvement in the student's motivation to learn. Of course, the student had some relapses sometimes during the sessions. Still, these

negative expressions disappear immediately if the researcher reinforced her and told her that her writing is improving and that you have already improved.

### **Student C**

In the first session, the researcher got to meet the student and explained the importance of the research to the student. The researcher wanted to make sure that the student was suitable for the research, because the school staff informed the researcher that the student was first diagnosed with slow learning, and then she was diagnosed with learning difficulties after moving to the Academic City School. After completing the first session, the researcher decided to include the student in the research, as the student suffers from learning difficulties and has the ability to learn. The student showed low motivation to write, and she was afraid of making mistakes, as she said “I mess with letters sometimes. She has a noticeable problem in distinguishing letters, differentiating them, and connecting them to each other, but at the end of the session, the student's motivation went up a lot, and she seemed relieved and happy.

In the second session, the student showed more comfort, and she was not tense nor did she say anything negative about her writing. She was smiling wildly after each reinforcement. The student needs continuous reinforcement as she writes, and the researcher has to assure her that her writing is correct or she would not write. The student doesn't trust that she can write, and she constantly asks if she is writing correctly, it was very clear that the student was happy and relaxed at the end of the session.

In the third session, the student showed improvement and remembered many of the points she had learned in the previous session. She was more confident in this session, but despite this, she inquired before writing any word and liked to make sure that she was writing correctly. The student finished early that day.

In the fourth session, the student tried hard to remember the lesson she learned with the researcher. She also tried to memorize the letters that she learned, and remembered the difference between similar letters that the researcher explained to her in the previous session, and the student stopped saying any negative words about her writing completely, and the researcher believed that it is due to the high motivation of the student to write, and the student no longer needs to look at the researcher after every word she writes, and her confidence has become higher in her writing, but she still needs to make sure sometimes that her writing is correct.

In the fifth session, firstly the teachers and students warned the researcher that the student C was feeling pressure and was crying a lot because she didn't solve one of her tests well, but when she entered the experiment class she was smiling and happy that the researcher came, additionally, her features didn't show that she was sad, but it was clear that she was crying. The researcher tries to not put pressure on the student, the researcher doubled the reinforcement because the student was in need of stimulation, and the student responded excellently, and she felt accomplished after completing the experiment.

In the sixth session, the student remembered a lot of what she had learned in the previous session. She wrote a whole word correctly, and this is a very big development because this is her first long word. She wrote before short words such as (that, in), so this is considered a development. The student was feeling determined and unwavering, and she wrote an additional correct word outside the text (moon). She remembered everything she learned in the previous lesson.

The last and seventh session. The student's performance is generally good. She remembers the previous information, and she no longer asks the researcher to make sure of every letter she writes. She now writes complete words. This is evidence of the development of writing, as well as the increase in motivation to learn and the increase in her self-confidence, so she no longer needs help from the researcher and double reinforcement from her.

Table C

Average number of errors for student C calculated by dividing number of errors by

The written errors							
type of errors	Day 7	Day 6	Day 5	Day 4	Day 3	Day 2	Day 1
adding a letter	0.25	0.111	0.444	0.636	0.090	0.5	0.285
omit a letter	0	0.333	0.111	0.909	1.727	1.25	0.857
switch a letter	0.416	1.111	1.222	0.090	0.818	0.875	1.128
phonetic typing errors	0	0	0	0	0	0.125	0.285
Average	0.416	0.388	0.444	0.408	0.658	0.687	0.638

the number of written words.

The results in the table C show an improvement in the student's performance, and the researcher noticed that the student completely stopped saying anything negative about the way she wrote. The student also increased her motivation to learn, so she was no longer afraid of writing and didn't need high reinforcement from the researcher. The improvement in the student's performance shows her ability to learn and that she suffers from a learning disorder, and it may improve significantly with training and continuity. The researcher believes that the improvement is due to the high motivation of the student and her writing improvement. The researcher was unable to double the sessions, and the reason is due to the student's absence and the presence of a vacation in the middle of the experiment time.

## Student D

In the first session, the researcher introduced the research to the student, and the student showed little interest in the importance of the research. The student was hesitant while writing, but she never asked for help. The student's performance is average, as she writes well, but there are many spelling errors, and the student rarely feels bored or tries to evade the study. The student is very quiet and hardly speaks.

The second session, the student's performance did not differ from the previous session, but she had more confidence. The student finished writing after the end of the experiment time, and some signs of fatigue appeared on her. Therefore, the researcher reduced the words that the student should write in the next sessions, but with the progress of the sessions, the student became able to write more words. Therefore, the researcher increased the number of words.

In the third session, the student entered to the class looking relaxed and happy, the researcher tried to adhere to the method that helps the student to write, which is (pronouncing the letters very slowly and clearly). The student was confident and comfortable during the session, and she remembered some of the previous lessons, and she also learned new things and made clear progress.

In the fourth session, the student entered the classroom and looked comfortable. The researcher reinforced her with a simple gift because she is in the same class as student A, who was reinforced with a gift because of her need for greater reinforcement. She managed to finish writing faster than usual but she felt a little bored.

In the fifth session, the student improved during the sessions and became more confident. Her mother called and asked her to leave school early, so she was trying to write quickly, but she didn't ask to leave early. After the student left, she came back and thanked the researcher. Even though she is very quiet and doesn't express her feelings. And she remembers a lot of the information she studied in the previous session, and the researcher thinks that this is evidence of an improvement.

In the sixth session, the student entered the classroom smiling, but she seemed tense, the researcher didn't know why, but overall, the student performance is good, even so she didn't want to modify some of the words, but rather asked to write them again, so the researcher agreed, as she didn't want to compress her.

In the seventh session, the student doesn't want to come to school today, as there are not many students in the school, but the student attended because she had an exam. The student responded and learned new lessons, but she showed some boredom at the end of the session, and this is very rare, as the student doesn't get bored usually. And she took twice as long to write, but she wrote well. (Note: The student's resolve is low today because of her inability to take the test that she came to school to take, and this made her sad).

In the eighth session, the student showed improvement, but she constantly asks the researcher not to modify the wrong words, but to write them again at the bottom of the page, but the researcher tries to follow the instructions of the research, but she allowed

the student sometimes to write the word at the bottom of the page, especially if the word cannot be corrected. The researcher believes that the student's writing motivation has increased, as she no longer hesitates while writing as before.

**Table D**

The written errors								
type of errors	Day 8	Day 7	Day 6	Day 5	Day 4	Day 3	Day 2	Day 1
adding a letter	0.119	0.285	0.1	0.111	0.166	0.208	0.318	0.2
omit a letter	1.142	1.380	0.875	0.740	0.333	1.125	1.454	1.28
switch a letter	0.285	0.261	0.2	0.370	0.0833	0.25	0.454	0.36
phonetic typing errors	0.047	0.095	0.125	0.0740	0	0.333	0.045	0.32
Average	0.398	0.505	0.325	0.323	0.133	0.479	0.567	0.54

Average number of errors for student D calculated by dividing number of errors by the number of written words.

The table D shows the student's improvement. The researcher believes that the student has improved in general and showed a clear improvement in writing, as well as the motivation to learn, the student became less bored in each session, and she started thanking the researcher after each session. The data in Table D showed that there are more errors in average than usual on the fifth day, this is due to student distraction because the class next to the experiment class was loud. The student's driver came earlier than usual, so she was excited to finish the experiment quickly and leave, which may be the reason for the low performance. On the seventh day the student's performance is low this is due to the student's feelings because she was sad, as she was unable to take the ministerial exam with the rest of the students, so this made her feel like a failure and dissatisfaction, which affected her performance.

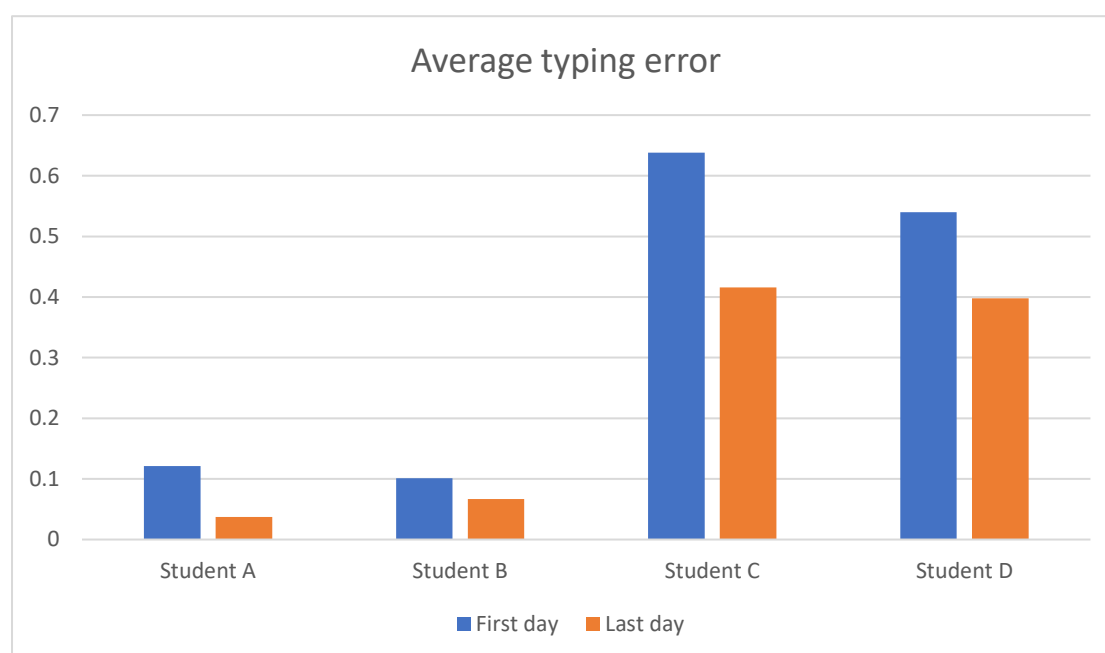
### **General discussion:**

Students' performance generally shows a development in the motivation to learn and write including improvement in writing. The researcher believes that operant conditioning is one of the effective ways to help students improve, and she believes that students with SLD in general may use operant conditioning to improve their writing without anyone's help. After they finish writing, they amend the sentence through the book they read from. The most important part is that they aren't supposed to say that there are doing mistake, but rather they reinforce themselves by saying that they are improving because they didn't make mistakes rather, they need to modify some words, and they should never cross out any words, but only amend it, and in this way, the student will be reinforced by writing better. If students with learning difficulties were



supported, they might show the same results as any other student in their same age group (Matteucci, and Soncini, 2021).

If this indicates something, it is the importance of training and programs that may help students with SLD to progress. Some studies have shown that modern technologies may help students with writing difficulties, as the study of Renumol and John (2018) showed that students benefited from the iPad-based training program, but the problem is that students may not find these modern devices, so the researcher wanted to find a way to train students without devices or assistance extrinsic which could be operant conditioning.



There are shortcomings in the research, as the students were dispersed when the teachers entered the experiment class, and the students didn't attend all the specified research days, so they were often absent from school, and because during the specified research period there was the Eid holiday.

### Conclusion:

In conclusion, the researcher believes that the students have developed in writing and motivation for learning, but each one in her own way. Most of the students remembered the information the researcher explained to them for example, how to differentiate between some letters. The continuous reinforcement with the students and not erasing the wrong words, but rather modifying them showed a positive result, so the students' writing improved (because erasing the words is considered a punishment). However, despite the progress of the students and the improvement of their writing, the result cannot be generalized because the sample is small. Students' inability to write affects all of their educational work (Chung, et al, 2020), therefore, the recommendation of the research is to provide assistance to students with learning difficulties, through studies on operant conditioning and generalizing the results may help a lot in their full academic progress, as well as combining operant conditioning with other behavioural methods. Future research could work on using operant conditioning to help students

with SLD, and they could combine operant conditions, and tiny habits methods from the book Tiny Habits by Bj Fogg (2020). “Tiny habits” is a method that helps people achieve their goals in an easy way and makes it a habit. The researcher believes that this will make it much easier for students with SLD to learn how to write.

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