CSCanada
Higher Education of Social Science
Volume 25, Number 1, 2023, pp. 120-124
DOI:10.3968/13121

ISSN 1927-0232 [Print]
ISSN 1927-0240 [Online]
www.cscanada.net
www.cscanada.org

Using the Single Case Design Approach to Evaluate the Effectiveness of a Problem-Based Program in Improving Self-Regulation Skills for Verbal Adolescents With Autism Spectrum Disorder

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Received 21 May 2023; accepted 15 August 2023
Published online 26 September 2023

Abstract

The current study aimed to evaluate the effectiveness of a problem-based program in improving self-regulation skills among verbal persons with autism spectrum disorder in the Kingdom of Saudi Arabia. It included 4 cases of persons with autism spectrum disorder, whose ages ranged between 16-18 years, in the Kingdom of Saudi Arabia. In order to achieve the aim of the study, a special program for solving problems, a scale of self-regulation skills was constructed, and the indications of validity and reliability were verified. To answer the questions of the study, the single case design approach was used (A-B-A). The results indicated an improvement in the self-regulation skills of the study individuals who received training in using problem-solving. The study recommended the application of problem-solving with young children with autism spectrum disorder, and the use of the two-group design (experimental and control).

Key words: Problem-Solving; Self-Regulation Skills; Verbal Persons with Autism Spectrum Disorder; The Kingdom of Saudi Arabia

Sweidan, M., & El-Zraigat, I. (2023). Using the Single Case Design Approach to Evaluate the Effectiveness of a Problem-Based Program in Improving Self-Regulation Skills for Verbal Adolescents With Autism Spectrum Disorder. *Higher Education of Social Science*, *25*(1), 120-124. Available from: URL: http://www.cscanada.net/index.php/hess/article/view/13121
DOI: http://dx.doi.org/10.3968/13121

AN INTRODUCTION

Autism spectrum disorder is a condition associated with brain development that affects how a person perceives and communicates with others, causing problems with social interaction and communication. The disorder also includes limited and repetitive behavior patterns (Mayo Clinic, 2022). However, communication skills and social interaction are challenging for persons with autism spectrum disorder. In addition, the persons exhibit behaviors and interests that may seem unusual. These behaviors or interests distinguish autism spectrum disorder from social communication disorder (Centers for Disease Control and Prevention (CDC), 2022; APA, 2022).

Most persons with autism spectrum disorder have other related characteristics. These may include: delayed language skills, delayed motor skills, delayed cognitive or learning skills, unusual eating and sleeping habits, gastrointestinal problems (such as constipation), unusual mood or emotional reactions, anxiety, and a lack of fear or more fear than expected (Mayo Clinic, 2022)

Nowadays, there are many programs and strategies aimed at providing them with adaptive skills. One these is problem-solving training which used to help persons learn how to become more adept at using constructive coping skills. The problem-solving training process includes acquiring the skills of defining the problem, identifying multiple solutions to address the problem, considering the results of each solution, choosing a solution and applying it to see its results through evaluation (Suldo, Parker, Shaunessy-Dedrick and O'Brennan, 2019; Ladouceur, and Walker, 1998).

During the training, the therapist briefly introduces the basic elements of each behavioral step. The first step, defining the problem, involves describing personal problems and goals objectively, specifically, and clearly. The problem definition should provide information that

will maximize performance in the next stages of problem solving but exclude information related to intolerance to uncertainty or excitement. Next, alternative solution generation includes brainstorming rules such as: avoid criticism, encourage solution generation determines the best appropriate strategy for the situation. Finally, application and evaluation of the solution involves checking how accurate the outcome prediction is. Evaluation involves observing and recording the consequences of actions. (Dugas, and Ladouceur, 2007).

Learning based on self-regulation is among the challenges facing persons with autism spectrum disorder. Therefore, teaching self-regulation skills is important for this group of persons. These strategies include learning to evaluate and record the occurrence of targeted behavior, and this aims to increase awareness and regulation of behavior (Wilkinson, 2010). Self-regulation interventions help individuals with autism spectrum disorder understand the rules and expectations of specific situations, and regulate their behaviors accordingly. The skills which can be targeted help the them to achieve adjustment and coping with daily life situation. Therefore, self-regulation interventions are designed to help individuals increase desired behaviors and/or reduce problem behaviors. The process of learning often aimed at teaching the distinction between appropriate and inappropriate behaviors and decisions, monitor and evaluate the results of their actions (Busick and Neitzel, 2010). Therefore, self-regulation is considered a pivotal strategy aimed at designing and implementing effective interventions to facilitate the inclusion of students with autism spectrum disorder into general education environments (Wilkinson, 2010, 2008, 2006).

Ayvazo, Brill, and Magal (2023) emphasized the importance of training students with autism spectrum disorder to solve problems. While the study of Sudiatmi, Wahono, & Muryati (2023) showed that a person with autism spectrum disorder can learn how to solve problems to be able to adapt to his social environment. The study of Bonete, Molinero, and Garrido-Zurita (2022) indicated an improvement in the performance of persons with autism spectrum disorder in the areas of problem definition, identifying causes, alternatives, results, time, and appropriateness of the solution.

In conclusion, self-regulation can be particularly effective when used as a component of a comprehensive intervention programme. Therefore, self-regulation is an effective and evidence-based strategy that facilitate the independency and self-management skills among persons with autism spectrum disorder (Parkhill Business Centre, 2022; Wilkinson, 2010). Thus, the current study aims to investigate the effectiveness of problem-solving training in improving self-regulation skills of verbal adolescents with autism spectrum disorder.

THE RATIONALE OF THE STUDY AND ITS QUESTION

Learning the strategy of using problem solving is an important technique in dealing with everyday situations. Its importance lies in the fact that using it achieves a better level of adjustment and coexistence with daily events. The persons with autism spectrum disorder, and as a result of the difficulties they face in communication, social interaction, and repetitive behaviors that cause difficulties in dealing successfully with daily events, problem-solving education enables them to solve problems and achieve a better level of mental health. On the other hand, problem-solving education promotes the process of self-regulation and managing the requirements of interaction with daily activities. Therefore, this study comes to identify the impact of learning problem solving strategies in improving self-regulation skills for verbal persons with autism spectrum disorder. Hence, the current study sought to answer the following main question:

> What is the effectiveness of a problem-based program in improving self-regulation skills among a sample of verbal adolescents with autism spectrum disorder in the Kingdom of Saudi Arabia?

PARTICIPANTS

The current study used the single-case design approach, as it included 4 cases of persons with autism spectrum disorder, between the ages of 16-18 years in the Kingdom of Saudi Arabia. The problem-solving program was applied to them and its impact on the acquisition of self-regulation skills was investigated.

SELF-REGULATION SKILLS SCALE

This scale was built to identify the ability of persons with autism spectrum disorder to use self-regulation skills by referring to previous scientific literature such as: (American Psychiatric Association, 2022; Axe, 2021; Axe, Phelan, and Irwin, 2019; Ayvazo, Brill, and Magal, 2023; Busick, and Neitzel, 2010; Kay, 2011; Marathon Communications Inc, 2009; Neitzel, and Busick, 2009). It consists of three components:

- Self-monitoring: This dimension measures self-monitoring and awareness of behavior.
- Self-assessment: It measures the observation and recording of behavior.
- Self-reinforcement: It measures the aspect of self-promotion when achieving the goals that are set.

To extract the indicators of the construct validity, the correlation between the items and dimensions of the scale were obtained. the correlation coefficients for each item and the total score, and between each item and

its connection to the domain to which it belongs, and between the domains with each other and the total score, were extracted in an exploratory sample from outside the study sample that consisted of (30) from outside the study sample, and the correlation coefficients of the items with the tool as a whole ranged between (0.82-0.94),

To ensure the reliability of the study tool, it was verified by the test-retest method by applying the scale, and re-applying it after two weeks on a group from outside the study sample consisting of (30), and then the Pearson correlation coefficient was calculated between their estimates both times. Correlation coefficients were of acceptable degrees and statistically significant.

Problem Solving Program: It is a set of problem-solving activities, exercises, and exercises aimed at improving self-regulation skills among a sample of verbal adolescents with autism spectrum disorder in the Kingdom of Saudi Arabia. The program was constructed and prepared based on theoretical literature and previous studies related to the subject of the study. The program included some problem-solving activities that can be used with persons with autism spectrum disorder. Teaching problem solving helps persons with autism spectrum disorder become more independent. The program included basic axes such as: learning awareness of the problem, problem identification skills, time management skills in solving problems, selecting solutions skills, implementing solutions, evaluating solutions skills, self-organization skills, and planning skills (Raising Children Network, 2022; Sautter, LeBlanc, Jay, Goldsmith, and Carr, 2011; Shillingsburg, Valentino, Bowen, Bradley, and Zavatkay, 2011; and Weiss, 2014).

STUDY METHODOLOGY

To answer the question of the study, the single-case design approach (ABA) (pre-assessment - treatment - post-assessment) was used. With symbols, the design is as follows:

A: A pre-assessment of applying self-regulation skills scale for each case.

B: Training on a problem-solving program for each case.

A: A post-assessment of applying self-regulation skills scale for each case.

RESULTS

This section presents the level of improvement in self-regulation skills for each case.

Case 1: A 16-year-old has significant problems with self-reinforcement in that he does not know how to reinforce himself at home, use a reward system to encourage the completion of his housework, praise himself for doing a task without being asked, know what he likes and use as a reinforce, and know what feelings he is experiencing. And when does he show sympathy towards peers and does not know how to control himself when he is tense or how to organize himself when he is asked for more than one task and does not know how to deal with harassment in acceptable ways and difficulties in communication and trying to finish completing the task and does not ignore others or situations that cause him stress. After training on the problem solving and self-regulation, which lasted for about 6 months, and included targeted exercises and activities to improve self-regulation skills, the situation has improved in a clear and useful way in practical life. He has improved recognition and preference skills, knows favorite activities and uses them as a reinforcer, uses physical reinforcers when he successfully completes a task, uses social reinforcers when he finishes a task, and engages in recreational activities after completing the task. His skills of understanding feelings also improved, as his ability to identify gestures of admiration and dislike increased, knowing the feelings he was experiencing, showing sympathy towards peers, not showing severe fears, and knowing some of the meanings of body language for others.

Case 2: An 18-year-old who has noticeable problems in following work rules, being aware of his behavior, recording his apparent behavior, knowing his emotions and when they occur, managing time in terms of focusing on what is most important most of the time, accomplishing priority tasks first every day, planning his activities and priorities for the next day, and setting realistic goals that can be implemented. After training in resolving social conflicts, which lasted for about 6 months, and included targeted exercises and activities to improve self-regulation skills, the situation has improved in a clear and useful way in practical life. The management skills have improved, recognition of preferences and uses, recognition of favorite activities and use as reinforcement, use of physical reinforcers when they successfully complete a task, use of social reinforcers when they have completed a task, and recreational activities after completing the task. His skills of understanding feelings also improved, as his ability to identify gestures of admiration and dislike increased, knowing the feelings he was experiencing, showing sympathy towards peers, not showing severe fears, and knowing some of the meanings of body language for others.

Case 3: A 16-year-old has significant problems in following work rules, being aware of his behavior, recording his apparent behavior, knowing his emotions and when they occur, managing time in terms of focusing on what is most important most of the time, accomplishing priority tasks first each day, planning his activities and priorities for the next day, and setting Realistic goals that can be implemented. In addition to difficulties in recognizing preferred activities and using

them as a reinforcer, using physical reinforcers when they successfully complete a task and when they use social reinforcers when they finish a task. After training in resolving social conflicts, which lasted for about 6 months, and included targeted exercises and activities to improve self-regulation skills, the situation has improved in a clear and useful way in practical life. Time management skills have improved, recognition of preferences and uses, recognition of favorite activities and use as reinforcement, use of physical reinforcers when they successfully complete a task, use of social reinforcers when they have completed a task, and recreational activities after completing the task. His skills of understanding feelings also improved, as his ability to identify gestures of admiration and dislike increased, knowing the feelings he was experiencing, showing sympathy towards peers, not showing severe fears, and knowing some of the meanings of body language for others.

Case 4: A 16-year-old has significant problems in following work rules, being aware of his behavior, recording his apparent behavior, knowing his emotions and when they occur, managing time in terms of focusing on what is most important most of the time, accomplishing priority tasks first each day, planning his activities and priorities for the next day, and setting Realistic goals that can be implemented. In addition to difficulties in recognizing preferred activities and using them as a reinforcer, using physical reinforcers when they successfully complete a task and when they use social reinforcers when they finish a task. Also, the case in the tribal measurement showed difficulties in recognizing the feelings he is experiencing, empathy towards peers, intense fears, and he does not know the meaning of the body language of others. After applying problem-solving training, which lasted for about 6 months, and included targeted exercises and activities to improve self-regulation skills, the situation has improved in a clear and useful way in practical life. The management skills have improved, recognition of preferences and uses, recognition of favorite activities and use as reinforcement, use of physical reinforcers when they successfully complete a task, use of social reinforcers when they have completed a task, and recreational activities after completing the task. His skills of understanding feelings also improved, as his ability to identify gestures of admiration and dislike increased, knowing the feelings he was experiencing, showing sympathy towards peers, not showing severe fears, and knowing some of the meanings of body language for others.

THE LIMITATIONS AND DELIMITATIONS OF THE STUDY

The limitations were represented by the characteristics of the study sample of verbal adolescents with autism spectrum disorder and the age group of 16-18 years. It is also determined by the content of the activities and trainings, the degree of commitment to practicing them, the content of the standards, and the degree of accuracy in answering them. The study was also determined when it was conducted in the first semester of the academic year 2022-2023 and the place of its application in the Kingdom of Saudi Arabia.

DISCUSS RESULTS AND CONCLUSIONS

The results indicated that the study individuals improved in the pre- and post-measurement on the self-regulation skills scale. Individuals with autism spectrum disorder display significant difficulties and challenges in self-regulation skills, which are necessary to live and function independently in everyday contexts. The program that was trained on helped to develop the components of self-regulation, which included self-monitoring and behavioral awareness skills, through monitoring and recording behavior. The program also used self-reinforcement when achieving the goals that had been set. The program used procedures and exercises that increased desired behaviors and decreased problem behaviors. That is, the program helped develop self-regulation skills and this was reflected in their performance as they became more independent by teaching them to identify and monitor their behaviors. It was also clear from the program training that the procedures helped improve social skills and that this was also linked to the development of self-regulation skills of the participants in the current study, as they became more independent and more interactive with others. Self-regulation skills helped to improve the participants' better life skills. They also become more aware of social cues and the expectations of others. They were better able to communicate and interact effectively with others and overcome many social challenges. In conclusion, the result of the improvement of the participants in this study is due to the nature of the exercises included in the program, which lasted about 6 months of training and follow-up. This helped increase the ability of persons with autism spectrum disorder to use self-regulation skills. More specifically, the program worked from exercises and activities to develop self-monitoring skills, awareness of behavior and planning, and this in turn helped in developing self-evaluation skills through observing and recording behavior, and the program also helped to acquire self-reinforcement skills when achieving the goals that are set.

In light of the results, the study recommends the following:

- The need for persons with autism spectrum disorder to acquire problem-solving skills.
- Using other variables and knowing the impact of problem solving on the severity of autism spectrum disorder.

• Use the program with younger ages.

• The current study used the single case study approach, and it may be useful to repeat it using the design of the two groups (experimental and control).

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