The Flexibility of Executive Function: Implementing Social Story for Children with Autism Spectrum Disorder

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Abstract. So far, many cases of children with autism spectrum disorder (ASD) have been found to have various comorbidities, one of which is executive function. These skills, support the flexibility of individuals to be able to complete daily tasks and understand the sequence of schedules. However, some cases of flexibility disorders in children with ASD have an impact on difficulties in dealing with schedule changes which are indicated by anxiety. This study aims to implement social stories to increase flexibility in children with ASD. This study uses the SSR (Single Subject Research) method with an A-B-A design. The data analysis was carried out in two stages, namely analysis between conditions and analysis under conditions. Based on the results of the research between conditions, the results overlap percentage is 0%. The results concluded that social stories influence flexibility by reducing the anxiety level of autistic children when there is a change in the schedule of their activities at school.

Keywords: Children with ASD · Social Story · Flexibility · Executive Function

1 Introduction

Children with ASD experience three main disorders called the autism triad in the realm of developmental delays in aspects of communication, social interaction, and showing maladaptive behavior in the form of repetitive and restricted (American Psychiatric Association, 2013; Junaidi et al., 2021). The complexity of these problems makes children with ASD have a big challenge in completing daily activities. Generally, the Triad of Autism has an impact on cognitive aspects that are not stimulated properly (Cashin & Barker, 2009; Happé & Ronald, 2008). In addition to having the main disorder, autism also has accompanying disorders, namely hyperactivity which is characterized by several symptoms, including lack of attention, impulsivity, anxiety disorders, and developmental disorders (Chusairi & Hamidah, 2003). In the field, there are many cases of children with ASD who have difficulty changing routines (Tokatly Latzer et al., 2021). This ability is closely related to the ability of the Executive Function. The executive function itself is a cognitive process in the brain that plays a role in controlling emotions and behavior (Siregar, 2018). Within the executive function ability, there are several components, namely planning, which in this case refers to the ability to plan and achieve a

B. B. Wiyono et al. (Eds.): ICEMT 2022, ASSEHR 727, pp. 593–599, 2023.
https://doi.org/10.2991/978-2-494069-95-4_68

goal. The second is awareness of the problem (inhibition), which in this case refers to self-awareness of what is being done. Problem-solving is the ability to solve problems. Finally, namely, Flexibility, is the ability to adapt to new activities, routines, or schedules (Irvan, 2019).

In some cases, children with ASD have similarities with Anxiety Disorder (Kerns & Kendall, 2012). They often show symptoms of anxiety at certain moments. This case was also found in a preliminary study conducted at special school in Malang Indonesia. Students with ASD show excessive anxiety when faced with changes in daily schedules. Some literature states that this problem is related to the flexibility function. Flexibility function conceptually can be interpreted as a skill to be able to adapt to changes in routine (Tyas et al., 2021). The case found by researchers is the emergence of anxious behavior when facing changes in school activity schedules. Anxiety is followed by crying and babbling, even with restlessness and anger.

Children with ASD have unique characteristics that make them more focused on visual stimuli, thus making them have a visual learning style. Therefore, Picture Exchange Communication System (PECS) and Treatment and Educaation of Autism and Children with Communication Handicaped (TEACCH) methods have long been implemented which utilize the role of images to assist them in understanding communication (Gándara Rossi, 2007). Previous research has shown that social stories have a very good effect in helping them understand the sequence of social activities. The social story itself is a short story that can be used to help autistic people understand social conditions and their responses (Lumbanbatu, 2017). Social stories can be used as a communication medium for autistic students to better understand some behaviors or responses to a situation. Based on the findings of cases in schools, researchers attempted to implement social stories with the aim of increasing flexibility function and minimizing anxiety symptoms in ASD children.

2 Methods

The research that has been done seeks to increase the flexibility function of schedule changes through the application of social stories during school activities. The subject involved is one child with ASD who shows symptoms of anxiety when faced with changes in routine schedules. Therefore, this study uses the single-subject research (SSR) method (Kratochwill, 2013). This research design applies the A1-B-A2 cycle to describe the relationship between the independent variable and the dependent variable. Cycle A1 is Baseline 1 used as a process of analyzing behavior patterns before applying treatment. This phase lasts for one week. Cycle B is a treatment process that lasts for one week by implementing social stories during school activities. A2 is baseline 2 and is used in the process of measuring behavior change after the treatment is implemented. Measurement of flexibility function is emphasized on indicators of anxious behavior which include physical, behavioral, and cognitive aspects (Mandler & Sarason, 1952). Based on these indicator points, a scaled assessment is formulated. While in the treatment process, social story learning is implemented with topics related to schedule changes. The learning includes three stages, namely introduction, understanding, and reflection. Through the process of these stages, it is assumed that the subject is trying to tolerate schedule changes by understanding social stories.

3 Result and Discussion

In the first cycle, behavioral pattern analysis was carried out by experimenting with changing the schedule of rest sessions in the middle of learning activities. In this trial, the break session schedule was made one hour later. The results of the analysis of behavior patterns in cycle A1 showed an increase in symptoms of anxious behavior and difficulty following schedule changes (Table 1). On the first and second days, the subject showed a pattern of anxious behavior symptoms such as shaking, restlessness, crying, anger, and difficulty concentrating on learning activities in class. On the third day, the symptoms got worse.

This condition is reinforced by changes in class settings that aim to demonstrate their ability to adapt to changing and new situations. Through this change, the subject showed symptoms that were relatively more extreme than in the first and second meetings, namely tantrums, crying, throwing, and gripping the teacher. At the fourth and fifth meetings, the subject was conditioned again in a different room from the previous meeting. This room has a strategic location that students pass during the break session. In the last two days of A1, the subject showed symptoms that were increasingly difficult to control (identical behavior in the meltdown condition) accompanied by screams of fear. Various academic tasks cannot be completed.

Second cycle, the researcher tries to implement social story learning in one week. On the first day, the subject still showed some anxious behavior during the learning process such as restlessness, shaking, refusing instructions, anger, and crying. This condition is caused by the subject who still remembers the moment that occurred during the trial in the A1 cycle. This situation causes the subject to be still not conditioned to the introduction of social stories. In the second meeting, the subject began to show changes in conditions by paying attention and reading social stories independently. Subjects also began to provide feedback when asked a question, although it was accompanied by anxious behavior such as anger, crying, and shouting with a lighter frequency. On the third and fourth days, the subject began to show a calmer attitude and pay attention to the teacher when the social story was read. Subjects also gave a better responses to the teacher's questions. On the last day of treatment, the subject was able to explain what to do when the schedule and class settings changed. Even at this meeting, the subject seemed calm and was able to complete academic assignments even though he was in a class that other students passed during recess.

Table 1. Symptoms of Anxious Behavior

Session	Scoring	%
1	28	53%
2	29	55%
3	30	57%
4	32	61%
5	34	65%

Table 2. The Result of Anxiety Behavior

Session	Scoring	%
1	18	35%
2	19	37%
3	17	33%
4	16	31%
5	15	29%

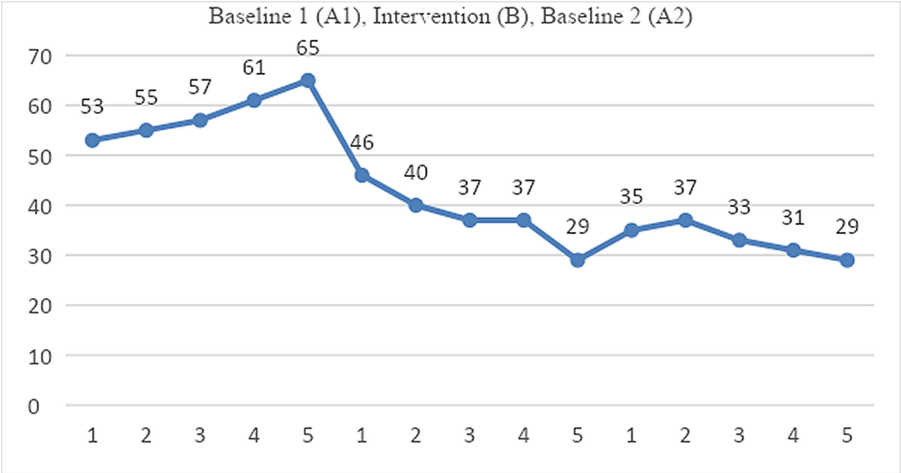

Fig. 1. Data Recapitulation

Meanwhile, in the last cycle, another trial was conducted to change the situation and the routine schedule (the rest session schedule changed to be faster than the normal schedule). Data recording in cycle A2 showed that the results of anxiety behavior were relatively decreased (Table 2). On the 1st day, the subject showed more anxiety because he faced a different situation. The subject appears restless, refuses instructions, and trembles. On the 2nd day, the subject was relatively calmer but did not focus on learning when he saw his friend passing by during recess. On day 3, the child begins to calm down and relax. Conditions are getting better after the teacher tries to recall the social stories that have been learned in the previous session. On the 4th and 5th days, it seems that there is not much anxiety behavior. The subject can explain what to do when the routine changes. Although in this cycle they still showed anxious behavior, the intensity and frequency were relatively decreased. This comparison can be observed in the changes in each session (Fig. 1). Although not significant, the changes appear to increase by 53–65% in cycle A1. While in the intervention process the frequency of anxiety symptoms was relatively decreased by 46–29%. This condition is getting better as shown in cycle A2 with a decrease in symptoms, namely at a score of 35–29%.

Based on the results of the two-cycle trial and one-cycle treatment, it was proven that there was a decrease in anxiety symptoms. This condition reflects that the subject can adapt to changes in routine. The results of the analysis at baseline 1 level of anxiety was at a score of 58.2%. That is, in this condition the subject has a low flexibility function. During the treatment process, the subject began to understand the information presented in the social story and showed good progress in the flexibility function. This proves that the treatment has a satisfactory effect. Furthermore, in cycle A2 the symptoms of anxiety decreased and reached the level of 33%. Although anxiety still appears, the intensity and frequency have been greatly reduced compared to the previous phases.

This result is correlated with previous research which proves that social stories produce satisfactory progress in learning for children with ASDD (Beh-Pajooh et al., 2011). Visual learner characteristics in children with ASD are an advantage to make it easier for them to remember information in social stories (Alitani, 2018). Other studies also agree with this evidence, which can reduce anxiety levels in 5 out of 10 autistic subjects given social stories (O'Connor, 2009). Even social stories have also been shown to be able to reduce the frequency of tantrums in children with ASD by 1.6% accompanied by a decrease in the duration of tantrums by an average of 1.5% after the intervention in the form of using social stories (Alitani, 2018; Siregar, 2018).

This research analysis strengthens based on the results of the overlap percentage of 0% so that it can be concluded that the lower the overlap percentage results, the higher the effect of treatment on target behavior. The results of cycle 1 (A1) on the response of cycle B there was a positive change. Then it was tested again in cycle A2. This phenomenon proves that the application of social stories in the treatment process affects the target behavior, namely increasing the flexibility function against changes in routine. This evidence has similarities with other studies per the results of research that prove some children with autism subjects experienced a decrease in anxiety after being given an intervention in the form of a social story (Mazefsky et al., 2018).

4 Conclusion

Children with ASD have a variety of characteristics. Although social stories are proven to have a positive effect in increasing flexibility, design and content really need to be adapted to the context and characteristics of children. Moreover, the success of this study cannot be generalized because it is based on a single case found in the field. Therefore, the researcher tries to suggest to the teacher that the development of the next social story must be adapted to the conditions of the problems experienced by the students. In further research, it is necessary to study the involvement of teachers and their competence in implementing social stories. This is based on the concept of social story content which is still being debated by teachers in schools. Furthermore, the implementation of social stories is also important to involve parents or caregivers. It is hoped that the content and subsequent development will be more relevant and implementative in various social situations.

References

Alitani, M. B. (2018). Pengaruh Metode Social Story Terhadap Penurunan Temper Tantrum Pada Anak Dengan Gangguan Autism Spectrum Disorder. 15(September), 483–498.

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders. In *American Psychiatric Publishing* (Vol. 21, Issue 21).

Beh-Pajooh, A., Ahmadi, A., Shokoohi-Yekta, M., & Asgary, A. (2011). The effect of social stories on reduction of challenging behaviours in autistic children. *Procedia - Social and Behavioral Sciences*, *15*(December), 351–355. https://doi.org/10.1016/j.sbspro.2011.03.100

Cashin, A., & Barker, P. (2009). The triad of impairment in autism revisited. *Journal of Child and Adolescent Psychiatric Nursing*, *22*(4), 189–193.

Chusairi, A., & Hamidah, T. (2003). Efektivitas Terapi Bermain Sosial Untuk Meningkatkan Kemampuan Dan Keterampilan Sosial Bagi Anak Dengan Gangguan Atism. *Journal.Unair.Ac.Id*, 1–25.

Gándara Rossi, C. C. (2007). Implementing TEACCH educational intervention principles and communication strategies for persons with autism. *Revista de Logopedia, Foniatria y Audiologia*, *27*(4), 173–185. https://doi.org/10.1016/s0214-4603(07)70086-4

Happé, F., & Ronald, A. (2008). The 'fractionable autism triad': a review of evidence from behavioural, genetic, cognitive and neural research. *Neuropsychology Review*, *18*(4), 287–304.

Irvan, M. (2019). Executive Function Patterns in Children with Autism Spectrum Disorder (ASD). *The 4th International Conference on Education and Management (COEMA 2019).*

Junaidi, A. R., Dewantoro, D. A., Yuwono, J., Irvan, M., Alamsyah, Y., & Mulyawati, N. W. (2021). The Acceptance Level of Low Functioning Autism while Using Virtual Reality Head-Mounted Display. *2021 7th International Conference on Education and Technology (ICET)*, 199–203.

Kerns, C. M., & Kendall, P. C. (2012). The presentation and classification of anxiety in autism spectrum disorder. *Clinical Psychology: Science and Practice*, *19*(4), 323.

Kratochwill, T. R. (2013). *Single subject research: Strategies for evaluating change*. Academic Press.

Mandler, G., & Sarason, S. B. (1952). A study of anxiety and learning. *The Journal of Abnormal and Social Psychology*, *47*(2), 166.

Mazefsky, C. A., Yu, L., White, S. W., Siegel, M., & Pilkonis, P. A. (2018). The emotion dysregulation inventory: Psychometric properties and item response theory calibration in an autism spectrum disorder sample. *Autism Research*, *11*(6), 928–941. https://doi.org/10.1002/aur.1947

O'Connor, E. (2009). The use of social story DVDs to reduce anxiety levels: A case study of a child with autism and learning disabilities. *Support for Learning*, *24*(3), 133–136.

Siregar, N. R. (2018). "Cool" dan "Hot" Brain Executive Functioning dan Perfomansi Akademik Siswa. *Buletin Psikologi*, *26*(2), 97. https://doi.org/10.22146/buletinpsikologi.38817

Tokatly Latzer, I., Leitner, Y., & Karnieli-Miller, O. (2021). Core experiences of parents of children with autism during the COVID-19 pandemic lockdown. *Autism*, *25*(4), 1047–1059. https://doi.org/10.1177/1362361320984317