Level of Knowledge and Frequency of Use of Applied Behavior Analysis among Specialists of Autism Spectrum Disorder in Batna

مستوى معرفة وتكرار استخدام تحليل السلوك التطبيقي بين متخصصي اضطراب طيف التوحد في باتنة

Rabehi Amina, Kaouli Nadir
Batna 02 University (Algeria), a.rabehi@univ-batna2.dz
Batna 02 University (Algeria), n.kaouli@univ-batna2.dz

Abstract

Autism Spectrum Disorder (ASD) has become widespread recently. Most of the analysis supports the utilization of Applied Behavior Analysis (ABA) strategies to minimize challenging behaviors with ASD people. However, very little is dealt with concerning the level of knowledge and frequency of use of ABA. This study has surveyed 44 male and female ASD specialists of different centers in Batna who have been asked to fill-in a questionnaire. The findings indicate that female specialists tend to have more level of knowledge and frequency of use of the ABA strategies. On the same token, specialists who have attended training programs are more knowledgeable and use these strategies frequently. Results of this study indicate that the specialists ought to be trained to be aware of autistics' needs and deal with them in an appropriate way.

Keywords Autism Spectrum Disorder; Applied Behavior Analysis; Strategies; Level of knowledge; Frequency of use.

الملخص:

لقد أصبح اضطراب طيف التوحد (ASD) اكثر انتشارا مؤخرًا وهذا ما استدعى تعدد البحوث المقدمة حول الموضوع. تدعم معظم الدراسات استخدام استراتيجيات تحليل السلوك التطبيقي (ABA) لتقليل السلوكيات الصعبة للمصابين باضطراب طيف التوحد. ومع ذلك ، لم يتم تقديم بحوث فيما يتعلق بمستوى المعرفة وتكرار استخدام هذه الاستراتيجيات. اعتمدت هذه الدراسة على 44 مشاركا من الذكور والإناث المتخصصين في هذا الاضطراب من مختلف المراكز في ولاية باتنة الذين طُلب منهم ملء الاستبيان الموزع.

تشير النتائج إلى أن الاناث تميل إلى الحصول على مستوى أعلى من المعرفة ومعدل تكرار استخدام استراتيجيات ABA مقارنة مع الذكور. على نفس المنوال ، المتخصصون الذين حضروا برامج تدريبية يعتبرون أكثر معرفة ويتكرر استخدامهم لهذه الاستراتيجيات. تشير نتائج هذه الدراسة إلى وجوب تدريب المتخصصين وذلك ليكونوا على دراية اكثر باحتياجات المتوحدين والتعامل معهم بالطريقة المناسبة.

الكلمات المفتاحية: اضطراب طيف التوحد؛ استراتيجيات؛ تحليل السلوك التطبيقي؛ مستوى المعرفة؛ تكرار الاستخدام.

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Corresponding author: Rabehi Amina, a.rabehi@univ-batna2.dz

1. INTRODUCTION

Autism is a rare neurodevelopment disorder of genetic origin. Although, it is discovered, nowadays, that there is no one cause of autism, research points out that autism develops from both genetic and non-genetic influences. One of the hallmark characteristics of individuals with ASD is their difficulty understanding and producing either verbal or non-verbal aspects

of social communication. Bruner (1975, 1983) and Vygotsky (1962) proclaim that all learning, i.e., also language learning is established in social interaction, most remarkably between parents and their children. Language is considered an important diagnostic and prognostic factor in autism. Regardless of theoretical perspective, language issues are important to describe autism spectrum disorders, ranging from lack of verbal communication to pedantic speech (Miilher & Fernandes, 2009).

The history of ABA is as ancient as the beginning of human civilization when individuals have begun to affect the behavior of another. The Experimental Branch of BA has begun in 1938 with the publication of B.F. Skinner's first major treatise The Behavior of Organisms. Skinner's research identifies two types of behavior: respondent and operant (Cooper, Heron, & Heward, 2007). Credit for the primary successful demonstration of the employment of ABA as an intervention for children with ASD rests with Ferster and DeMeyer (1961). They demonstrate that these children could learn complex skills by regularly increasing the complexity of tasks and by promoting learning with the durable reinforces.

The present study functions as an addition to the current knowledge. It is time for researchers to follow the creative pathway to make much of the work in autistic children's language, as we know it today, possible. Prior to this study, it was not perspicuous to what extent specialists of autism (teachers, speech therapists, caregivers, and psychologists) in Algeria, specifically in Batna, knew about ABA or the extent to which they use ABA strategies, if at all. It was also unclear how certain factors, such as demographic characteristics influence teachers' knowledge and use of ABA strategies. The effect of gender on teachers' knowledge and use of ABA strategies is

ambiguous. It is not clear how the knowledge and use of ABA strategies by teachers of students with autism differ by gender, education, and experience. Therefore, the present inquiry addresses the following question: To what extent do ASD specialists consider themselves to be knowledgeable about the ABA strategies and how frequently they use these strategies across different demographic variables?

It is hypothesized that ASD specialists consider themselves to be knowledgeable about the ABA strategies and use these strategies frequently with effect of gender and academic level. Therefore, the appropriate method to follow is the quantitative survey investigation.

2. Method and Tools

The current section, which is consisted of three components, describes the methodology adopted in this study.

2.1. Sampling

The participants in this inquiry are drawn from the population of male and female specialists of ASD who are working at public and ASD programs attached to private centers in Batna. The specialists are divided into four categories; teachers, speech therapists, caregivers, and psychologists. The researcher has obtained a sample size of 44 ASD' specialists as survey studies always experience low response rates. This representative sample has been obtained from various institutes and centers in Batna city.

2.2. Research Design and Instrumentation

This research is designed as a quantitative survey investigation. The fundamental objective of a descriptive survey

is to test a hypothesis or survey a group of people concerning their viewpoints on specific matters. This survey consists of two sections: (a) participants' demographic information, and (b) teachers' knowledge and frequency of use of ABA strategies. The researcher has obtained a behavior management survey conducted by (Randazzo, 2011) to start with as the foundation. The survey has been modified (the original version contains five sections according to the purpose of the study) and items so that it meets the objectives of this inquiry as well for ABA strategies to be understandable to the participants. There has been a need for a Standard Arabic version of the survey because all participants are Algerians that are not acquainted with English.

In the first part of the survey, the demographic information of the participants are collected. Responses of the participants are scored as: response for gender scored as 1=male and 2=female, responses concerning the number of years of teaching are scored as "0-3"=1, "4-7"=2, "8-11"=3, ">12"=4. Additionally, responses for courses on both ABA and Behavior Management during teaching career and undergraduate or graduate education are scored as 1=yes and 2=no. In the second part, participants are asked to rate their knowledge about sixteen (16) ABA strategies in addition to the frequency of use of each strategy in the setting of a classroom. For each component, a Likert scale with three response options is provided. Participants answer to point out how knowledgeable they are about each strategy. They also mark a box to point out the frequency with which they use each strategy. The answers of the level of knowledge comprise: 1=Not knowledgeable, 2=Somewhat knowledgeable, or 3=Knowledgeable. Options for responding to frequency questions comprise: 1=I never use this strategy, 2=I occasionally use this strategy and 3=I often use this strategy.

2.3. Data Collection and Analysis

The study has undergone steps to be achievable starting with the question selected that is finally settled after several comprehensive readings. The questionnaire has been conducted by (Randazzo, 2011).The final version made of two parts; ten (10) questions composing the first part of it as well a second part that is made of 16 strategies of ABA (*strategies definitions are present in the questionnaire*). It should be noted that the translation was self-done then verified by a translator.

To answer the question, descriptive statistics; namely Percentages on Demographic Variables are generated. The researcher has used linear regression to investigate the association between the demographic information variables. The researcher has also investigated the average of knowledge of ABA strategies teachers have as well as average of the frequency of use of ABA strategies. Examples of the strategies are: *positive reinforcement, prompting, fading, extinction, punishment, and over correction*. In addition, the researcher evaluates the level of knowledge and the frequency of use of ABA strategies using the ordinal logistic regression. Data are analyzed utilizing SPSS 22. With regard to the statistics, the *exact* test is adopted.

3. Results

The objective of this study is to investigate the level of knowledge and frequency of use of ABA strategies by ASD specialists in Batna with regard to Demographic Variables.

3.1. Demographic Information

The researcher asked male and female specialists in Batna to fill-in the survey. A total of 44 specialists have responded.

Number of Years of Teaching: of the 44 participants, 77.3% and 9.1% have 0-3 years and 4- 7 years of teaching experience respectively. No one has responded for 8-11 years while 13.6% have more than 12 years of teaching experience (Table 1).

Gender: of the 44 participants, 20.4% are males and 79.6 % are females (Table 1).

Academic Degree: of the whole sample, 20.5% have a bachelor's degree, while 31.8% have a master's degree. 13.6% have a doctorate degree, and the remaining participants (34.1%) have chosen the option "others" (Table 1).

Table 1. Frequency/Percentage of D.V within Sample (n=44)

Demographic Variable	Frequency	Percentage (%)
Years of Teaching Experience		
0-3	34	77,3
4-7	4	9,1
8-11		
>12	0	0
	6	13,6
Gender		
Male	9	
Female		20.4
	35	
		79.6
Academic Degree		
Bachelor's		

Master's	9	20,5
PhD	14	31,8
Others		
	6	13,6
	15	34,1

Behavior Management Courses: As shown in Table (2), 59.1% of the participants have completed a course on behavior management related to ASD and 40.9% of them have not.

Course on Autism Behavior Management: 56.8% of participants have taken a course on ABA. 43.2% of the sample has not completed the course (Table 2).

ABA Training: The majority (63.6%) have completed training on ABA. However, 36.4% have not taken the training (Table 2).

Table 2. Frequency/Percentage of D.V within Sample (n=44)

Demographic Characteristic	Frequency	Percentage (%)
Behavior Management Course		
Took	26	59,1
Did not take	18	40,9
ABA Course		
Took	25	
Did not take		56,8
	19	
		43,2

ABA Training		
Took	28	63,6
Did not take		
	16	36,4

Number of ASD Students in Classrooms: Among 44 participants, 20.5% of the participants have 1-5 students, 29.5% have 6-10 students, 6.8% have 11-15 students, 11.4% had 16-20 students; and 31.8% have more than 20 students (Table 3).

Students' Age: Among the 44 participants, 79.5% of the participants have students in the age group of 6-9, 6.8% have students in the age group of 10-12, only one respondent (2.3%) have students in the age group of 13-15, and 11.4% have students in the age group of 16-21 (Table 3).

Table 3. Frequency/Percentage of D.V within Sample (n=44)

Demographic Characteristic	Frequency	Percentage (%)
Students in ASD Programs		
1-5	9	20,5
6-10	13	29,5
11-15		
16-20	3	6,8
>20		
	5	11,4
	14	31,8

Students Age		
6-9		
10-12	35	79,5
13-15	3	6,8
16-21	1	2,3
	5	11.4

Cognitive Impairment: Participants in the survey rated the cognitive level of ASD students. Of all participants, 65.9% of teachers have students with mild cognitive impairment, whereas 34.1% have students with severe cognitive impairment.

Behavioral Problems: 59.1% of the specialists have students with a mild behavior problem, whereas 40.9% of them have rated ASD students with severe behavior problems (Table 4).

Table 4. Frequency/Percentage of D.V within Sample (n=44)

Demographic characteristic	Frequency	Percentage (%)
Cognitive impairment	29	
Mil d cognitive	15	65,9
Severe cognitive		34,1
Behavior Problems		
Mild behavior	26	59,1
Severe behavior	18	40,9

3.2. Teachers' Level of Knowledge of ABA Strategies

Secondly, the researcher addresses specialists to rate their level of knowledge of each of the 16 ABA strategies (Table 5).

Table.5 Participants' Levels Knowledge and Frequency of Use of ABA Strategies (n=44)

Strategy	Not Knowledgeable %	Somewhat Knowledgeable %	Knowledgeable %	I do not use this strategy %	I use this strategy occasionally %	I use this strategy often %
Positive Reinforcement– Social	0	47,7	52,3	2,3	54,5	43,2
preferred activity	13,6	54,5	31,8	36,4	45,5	18,2
Token Economy	15,9	59,1	25,0	38,6	45,5	15,9
Food	4,5	77,3	18,2	31,8	52,3	15,9
Shaping	9.6	35.4	55	10	39.2	47
Behavior Contract	11,4	61,4	27,3	27,3	45,5	27,3
Behavior	29,5	45,5	25,0	34,1	18,2	47,7

Contract-Reward						
Modeling	6,8	52,3	40,9	20,5	27,3	52,3
Prompting	18,2	40,9	40,9	13,6	25,0	61,4
Fading	15,9	52,3	31,8	4,5	34,1	61,4
Group Contingency	43,2	31,8	25,0	43,2	20,5	36,4
Extinction	6,8	43,2	50,0	15,9	31,8	52,3
Punishment	25,0	31,8	43,2	52,3	25,0	22,7
Differential Reinforcement	29,5	36,4	34,1	47,7	18,2	34,1
Time Out	15,9	52,3	31,8	38,6	38,6	47,7
Overcorrection	9,1	61,4	29,5	20,5	29,5	50,0

As shown in the above table, 52.3% indicate that they are "knowledgeable" about *social positive reinforcement* strategy and 47.7% indicate that they are "somewhat knowledgeable". The *second strategy* is also evaluated. Results show that 31.8% are "knowledgeable" and 54.5% are "somewhat knowledgeable", comprising 86.3% of the responses. The rest 13.7% have no knowledge. The level of knowledge on the use of *positive reinforcement by token economy* strategy is as follows: 59.1% are "somewhat knowledgeable", 25% are "knowledgeable", and the 15.9% have no knowledge.

Participants are also assessed of their level of knowledge in the use of *food as positive reinforcement*. Of 44 participants, only 4.5% are "not knowledgeable". The majority (77.3%) are "somewhat knowledgeable". The remaining 18.2% are "knowledgeable" about this item. Fifty-five percent of the participants are "knowledgeable" about *shaping* strategy and 35.4% are "somewhat knowledgeable". The remaining 9.6% indicate that they have no knowledge.

To measure their level of knowledge about *the behavior contract* strategy, 11.4% of the participants are "not knowledgeable", 61.4% are "somewhat knowledgeable", and the remaining 27.3% are fully "knowledgeable" about this. Another item of *behavior contract* strategy is *reward*. About 45.5% respond as "somewhat knowledgeable" and 25% are "knowledgeable". The remaining 29.5% have no knowledge. In *modeling* strategy, a total of 40.9% and 52.3% respond as "knowledgeable" and "somewhat knowledgeable". The remaining 6.8% have no knowledge. For *prompting* strategy, 40.9% responded as "knowledgeable" and 40.9% responded as "somewhat knowledgeable". The remaining 18.2% have no knowledge. For *fading* strategy, 31.8% and 52.3% have responded as "knowledgeable" and "somewhat knowledgeable". The remaining 15.9% have no knowledge. Levels of knowledge about *group contingency* strategy are as follows: 25% have responded as "knowledgeable" and 31.8% as "somewhat knowledgeable". The remaining 43.2% have no knowledge.

To evaluate the *extinction* strategy, 50% have responded as "knowledgeable" and 43.2% as "somewhat knowledgeable". The remaining 6.8% have no knowledge. Another strategy is *punishment*. About 43.2% have responded as "knowledgeable" and 31.8% as "somewhat knowledgeable". The remaining 25%

have indicated that they have no knowledge. Regarding *differential reinforcement* strategy, the percentages are somehow evenly divided; 34.1% have responded as "knowledgeable" and 36.4% as "somewhat knowledgeable". The remaining 29.5% have no knowledge. Next is *time out* strategy; 31.8% of participants have responded as "knowledgeable" and 52.3% as "somewhat knowledgeable". The remaining 15.9% have no knowledge. Last is *overcorrection* strategy; 29.5% have responded as "knowledgeable" and 61.4% as "somewhat knowledgeable. The remaining 9.1% have no knowledge.

3.3. Teachers' Frequency of Use of ABA Strategies

Concurrent with the first question, the researcher investigates which of 16 ABA strategies ASD' specialists perceive themselves to use and how frequently. Table (5) shows that 43.2% and 54.5% have indicated they use *social positive reinforcement* strategy "often" and "occasionally". Only 2.3% have reported that they never used this. As far as the *preferred activity as positive reinforcement*; 18.2% of the participants indicate that they use this strategy "often" and 45.5% "occasionally". 36.4% have indicated that they never used this. For *token economy* strategy, 15.9% use this strategy "often" and 45.5% use it "occasionally". 38.6% of the participants have never used it. Next is *food as a positive reinforcement* strategy. Sixteen percent of the participants use the strategy "often" and 52.3% "occasionally". Thirty percent have never used this strategy. Six participants have not responded to the question on their frequency of use of the *shaping* strategy. About 47% of the participants use this strategy "often" and 39.2% "occasionally". Ten percent have never used it.

Regarding the *behavior contract* strategy, 27.3% and 45.5% of participants use this strategy "often" or "occasionally" respectively. The remaining 27.3% have never used this item. When questioned about the *behavior contract-reward* strategy, 47.7% use this strategy "often" and 18.2% "occasionally". Thirty-four have never used this. Fifty-two percent use the *modeling* strategy "often" and 27.3% "occasionally". About 20.5% have never used this. Sixty-one percent use *prompting* strategy "often" and 34.1% "occasionally". Thirteen percent have never used this item. Of all participants, 61.4% use the *fading* strategy "often" and 34.1% "occasionally". Only 4.5% have never used it. While 36.4% use *group contingency* strategy "often", 20.5% use it "occasionally", 43% have never used it.

When questioned about the *extinction* strategy, 52.3% used this strategy "often" and 31.8% "occasionally". Sixteen percent never used this item. Regarding the *punishment* strategy, 22.7% used this strategy "often" and 25% "occasionally". About 52% of the participants never used this. For the *differential reinforcement* strategy, 34.1% used this strategy "often" and 18.2% used it "occasionally". About 47.7% never used this item. Forty-eight percent of the participants used the *time out* strategy "often" and evenly 37.3% used this strategy "occasionally" and "never". Fifty percent used the *overcorrection* strategy "often" and 29.5% used this strategy "occasionally". About 20% of the participants never used this item.

4. CONCLUSION

Previous researchers have demonstrated the importance of specialists' comprehension to the successful execution of strategies for students with deficiencies (Auramidis & Norwich, 2002). Few studies have investigated viewpoints of ASD

specialists of students with disabilities in Algeria. The present inquiry is the first of its kind in Batna city to evaluate the level of knowledge and frequency of ABA strategies among specialists in Batna. Randazzo's study (2011) is conducted in two New Jersey elementary schools in the U.S. While Randazzo (2011) has examined elementary school, this study expounds to evaluate a population of ASD specialists.

4.1. Level of Knowledge of ABA Strategies

Levels of knowledge of ASD specialists can be an influence of confidence level and behavior management; they are somehow high in Batna. Ten out of 16 strategies (*using a preferred activity as positive reinforcement, Token Economy, earning food as a positive reinforcement, Behavior Contract, Behavior Contract-reward, Modeling, Fading, Differential Reinforcement, Time-out, and Overcorrection)* have more than 50% of participants to be "somewhat knowledgeable" with only 4%-15% of participants to be not knowledgeable at all. In five out of 16 strategies, participants consider themselves to be knowledgeable *(Positive Reinforcement- social, Shaping, Prompting, Extinction, and Punishment)*. For only one strategy (*Group Contingency: 43.2%)*, participants consider themselves to be "not knowledgeable". On the same token, Randazzo's (2011) results indicate that most teachers see themselves to be either "knowledgeable" or "very knowledgeable" about ABA strategies. For example, Randazzo's study identified five out of 15 ABA strategies with only approximately 6%-10% of participants reporting being either "not at all knowledgeable" or "slightly knowledgeable". Same as this inquiry, percentages of teachers who reported being either "not at all knowledgeable" or "slightly knowledgeable" about *group contingency* and *behavior contract* in Randazzo's study were 1.9% and 7.5% respectively.

A significant reason for the similarity in the may be due to the age of autistic students participants surveyed. In Randazzo's study, the focus is on (K-5) of students with ASD. In the present study, the highest percentage of the students' age is 1-9. Specifically, 80% had students in the age group of 1-9. Therefore, the elementary teachers and the participants of this study have the same percentage of the level of knowledge. Another probable reason is that both studies have a significantly higher proportion of female participants (almost 80% in the present study and 91.6% in Randazzo's study). It is found that females had significantly higher average levels of knowledge about ABA strategies than the male teachers. Because the sample size of males in these studies is small (n=9 for both studies), the researcher of this study recommends that future research has to assess a larger sample of male ASD specialists to determine more information about their perceived knowledge of ABA strategies. A final reason of the similarities found is the fact that both teachers of elementary schools and generally specialists of Batna centers have training programs and/or master's degree. Such similarities might have influenced the specialists' perceptions in the two studies. The results of the current study to manage autistic' behaviors are encouraging.

4.2. Frequency of Use of ABA Strategies

ABA is extremely effective with students with ASD to alter behavior instead of using punishment (Boutot & Hume, 2012). In agreement with Randazzo (2011), this study conjointly has found the ABA methods that are often implemented by the specialists of ASD are all positive instead of punitive methods (e.g., *social positive reinforcement, preferred activity as positive reinforcement, prompting, modeling , earning food as a positive reinforcement, extinction*). About 50%-60% of participants in

this study have reported using *prompting* and *modeling* methods often, whereas nearly 50% of them reported the remaining 4 positive ABA strategies as used often.

However, a relatively small percentage has used the two positive strategies *behavior contracting* (27%) and *food as positive reinforcement* (15.9%) often. Nearly one third of the teachers indicated that they have "never used" three strategies, *group contingency, punishment* and *differential reinforcement* in their classrooms. Randazzo's (2011) study also has stated that many teachers who have never used the *group contingency* strategy. The use of this strategy requires creating groups and rewarding an entire class which needs more resources and cost (Randazzo, 2011). The similar outcomes of Randazzo's study (2011) indicate that usually the teachers who think they are knowledgeable conjointly use these strategies very often. On another token in this study, a relatively greater proportion of the participants have been found to use a punitive strategy often more than was reported by Randazzo (2011). Specifically, *time out* strategy is used by 48% of the participants in this study. These obtained results call for the need of a professional development for ASD specialists in Batna city focusing on the benefits of positive strategies.

The results concurred with the findings from linear regression and highlighted the role of gender and ABA training in enhancing level of knowledge and frequency of use of most 16 ABA strategies. Beyond gender and ABA training, some strategies were significantly influenced by other demographic variables. Knowledge of *group contingency* strategy was lower than of *behavior contract-reward* and *differential reinforcement* strategies which are higher among teachers of students with severe behavioral problems. In contrast to positive strategies,

punitive strategies are less often recommended for use by teachers of students with ASD. Because the ABA strategies are significant for ASD specialists to enhance behaviors of autistics, the findings of this study will be beneficial and have to be shared with these specialists. It is expected that study findings will inform the research and specific communities of the pros and cons associated with: the use of ABA strategies for teaching autistics in Batna, the selection of specialists for centers, and the design of ABA training programs, based on gender, type of educational unit, and severity of behavioral/cognitive problems.

This study is limited because it is based on information obtained voluntarily from participants. We now know their perceptions of knowledge and use, but we do not know if these are actualized in the classroom. We also do not know if the teachers are truly knowledgeable about ABA (it is the participants' perceptions only). Future research could explore this through observational research.

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