

Research Article

Exploring the Antecedents and Consequences of Challenging Behavior in Learners with Down syndrome: an Intervention for Teachers on Functional Behavior Assessment at Deborah Academy

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Abstract: The purpose of this study was to evaluate functional behavior assessment (FBA) training for teachers on teaching children with Down syndrome who present challenging behaviors at Deborah Academy of Ethiopia. The intervention consisted of a two-week training program to diagnose this behavior and apply interventions. Results indicated considerable improvement in teachers' levels of confidence and competence in handling difficult behaviors. Teachers reported having more access to information about why students acted out and could deliver better interventions in response. The other results were observed: disruptive issues were reduced and a positive classroom climate. FBA training can offer useful materials to educators with students who display challenging behaviors such as Down syndrome students. It allows teachers to learn systematically as a result of the method, which is good for both student and teacher.

Keywords: challenging behavior, developmental disabilities, down syndrome, functional behavior assessment, teachers

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INTRODUCTION

Down syndrome (DS), a chromosomal disorder caused by the presence of an additional copy of chromosome 21, appears in humans in various forms (Hassold and Sherman, 2000; (Kazemi et al., 2016; Rachidi & Lopes, 2008). Though there is considerable diversity and a number of promising attributes and characteristics, cognitive and developmental delays bring challenges for this unique group of people (Nadjari, 2023; Steingass et al., 2011). Challenging behavior, among these, is crucial because it directly influences the learning process of others in a person's immediate environment (Lundqvist, 2013; Nevill & Benson, 2018; Patel et al., 2020; Patti et al., 2021a). The findings from previous research show difficult behaviors, such as tantrums, aggression, self-harm, and social withdrawal, were found to occur at significantly higher levels in persons with DS compared to the general population (Chapman & Hesketh, 2000; Lundqvist, 2013). This unfortunate number (Aguilar et al., 2023) highlights the relevance for teachers and care workers to create holistic approaches to comprehend and manage them (Feeley & Jones, 2006). Not doing so may hinder academic progress, reduce social interactions, and harm both the specific learner and their community. Disruptive outbursts can hinder participation in the class, harm friendships, and restrict academic and social skills growth (Elias & Schwab, 2013; Myles & Southwick, 2005). Moreover, such behaviors can be stressful and frustrating for the individual within their life and the support the individual has, including teachers, parents, and peers (Faragher & Clarke, 2013; Rietveld, 2002).

The behaviours that make a challenging behavior difficult represent a spectrum of responses between non-compliance and tantrums and other behaviors such as self-injury, hyperactivity and social withdrawal (Holler, 2010). Challenges are also described as challenges when it comes to following directions, experiencing meltdowns when frustrated, having fear resulting in self-injurious behaviors, having issues with impulse control or attention or withdrawing socially (Patel et al., 2018). It is important to realize that although these behaviors are challenging, for the most part are indicative of needs or challenges in their context that need to be met (Chapman & Hesketh, 2000). Understanding the causes of the problem with challenging behavior in people with Down Syndrome is an essential step to provide useful support (Nadjari, 2023; Nevill & Benson, 2018). This very intricate tapestry can often form into simple interlaced elements across the threads of communication; difficulties manifesting communication and behavior that become knots through communicating frustration and behavioral tangles (Patti et al., 2021b).

Sensory sensitivities such as inundatedness in light or touch from a cacophony of noise can unduly tangle patience and activate anxious threads (Di Benedetto, 2011). Cognitive constraints, where the loom with which we approach a task-knowing what commands to carry out or recalling and remembering expectations is perceived as warped - can lead to knots of frustration at not having completed tasks in time to comply (Nevill & Benson, 2018). Other knots on the medical front - the throbbing ache of an ear infection or the fraying edges of sleep deprivation - can also add to this jumbled tapestry (Newman et al., 2003; Reyes-Martín et al., 2022). Finally, all the emotional and social threads can bind up in a confusing pattern of behavior to frustration, boredom, low self-esteem, and social disconnection, where all they will cohesively make an experience in terms of having difficulty with challenging behaviour (Nevill & Benson, 2018).

Making a pathway to address challenging behaviors requires an understanding of their context and end goals (Smith & Fox, 2003). This involves examining more than just the cause

(behavior) of the behavior, rather understanding what causes you to engage in the behavior (antecedents) and what outcomes you produce (consequences) from this behavior (Moreno, 2011). Functional behavioral assessments (FBAs) become a kind of microscope; they observe and document data closely, observing what is happening behind the behavior to obtain insight into its function so that targeted interventions can occur (Feeley & Jones, 2008; Moreno, 2011; Neil & Jones, 2016). Antecedent Behavior Consequence (ABC) charts, much like a trusty detective notebook, carefully record: the “who, what, why,” of a given behavior: the “Antecedent,” the Behavior itself, and the Consequence resulting of the behavior, thereby providing helpful clues to potential triggers and motivators (Feeley & Jones, 2007). Lastly, interviews, and questionnaires serve as a conduit for open dialogue which collects information from teachers, parents, and the student about possible reasons and environmental contributors for the challenging behavior (Klann et al., 2014). Together we can begin to un-angle the knot of troublesome behavior and open up the process to intervention. In fact, context- appropriate, individualized approach to assessment are essential (Black et al., 2007). Each learner with DS is a distinctive individual and their problem behaviors are motivated by specific behaviors and will have specific functions (Moreno, 2011). Hence one must make individualized interventions based on the data gathered from a holistic assessment.

With the assistance from parents and caregivers, Deborah Academy, a learning setting for people with DS, is in the Lega Tafo Lega Dadi sub-city of the Sheger city administration in Ethiopia. But it has a big challenge to overcome: high levels of challenging behaviors among its students. These behaviors such as disturbances, aggression, self-injury, and social withdrawal and others are reported from multiple sources. On average, teacher reports show that there are about 5 disruptions per student per day; parental surveys show unsafe and unorganized management of school climate. Additionally, publicly available documents like IEPs reveal the prevalence of these behaviors and the high rate of students requiring interventions to manage aggression and whether this population is likely demonstrating undocumented aggression. This is backed by evidence of research such as a study that occurred in the Journal of Mental Health Research in Intellectual Disabilities and found that 30% of those individuals with DS showed challenging behaviors (Aguilar et al., 2023). The crux is, teachers don't know the causes. The behavior as per observation does not consider triggers such as sensory overload and communication difficulties. In interviews with educators, teachers stated that such narrow perspectives limit development of effective interventions, leaving both students and teachers unhappy and frustrated.

The current assessment practices at Deborah Academy also appear to be insufficient when it comes to these intricate matters. Feedback from teachers indicates that the assessments lacked in-depth and broadening as the essential determinants of behavior that are critical to understanding these individual behaviours have not been pointed out enough. And the teacher perspective and a lack of support in developing assessment strategies do not fit these needs in most cases. This is echoed in the literature, which may indicate in such available documents as IEPs, where interventions are perceived as generic and possibly ineffective. This narrow scope, as observed both from parents and educators, leads to non-targeted, inadequate interventions aimed at the underlying causes of problem behaviors, and continues to frustrate learners and educators. “The problem is deeper and complexity is visible that it means, the huge hurdles confronting these students with DS may bring difficulties in their academic and peer development because of problem behaviors and the significant hurdles they face in overcoming those challenges in social and academic domains (Moreno, 2010). They fail to succeed in education, social interactions are hindered and

engagement in class declines (Neil & Jones, 2016). Additionally, the onus to cope with these problems is on teachers, among others, mainly. The high level of interruption and stress that frequent exposure to managing challenging behaviors can create, and further disturb, a sense of job satisfaction, leading to a negative, negative learning effect on all students (Klassen & Chiu, 2010).

Moreover, it is evident that Deborah Academy must take a broad evidence-based view that speaks to how to deal effectively with the issue of challenging behavior in students with DS. This requires a paradigm shift, where reactive responses are replaced with pro-active interventions grounded in understanding the cause and function of these behaviors. Thus, the overall objective of the proposed study is to identify the toolkit that will be developed and implemented especially for teachers at Deborah Academy. We have developed a toolkit to equip educators with the strategies, tools, and methods to appropriately identify challenging behaviors including functional behavioural assessments and ABC charts. The toolkit will be designed to encourage teachers to identify the antecedents and consequences for each behavior and to create individualized and targeted interventions which will be able to address the underlying cause of the occurrence ultimately supporting learning, less stress and a more inclusive learning environment.

Although previous studies have extensively documented the prevalence, causes, and characteristics of challenging behaviors among individuals with Down syndrome (Chapman & Hesketh, 2000; Patel et al., 2018; Nevill & Benson, 2018; Aguilar et al., 2023), much of the existing literature has focused primarily on describing behavioral patterns, psychological characteristics, or generalized intervention approaches rather than developing practical, context-specific assessment tools for teachers working directly with learners in school settings. Studies by Feeley and Jones (2006, 2007, 2008), Moreno (2010, 2011), and Crone et al. (2015) emphasized the importance of FBA and behavioral interventions; however, these studies were largely conducted in Western educational contexts and did not specifically address the realities of schools in low-resource settings such as Ethiopia, where teachers often have limited training, insufficient assessment tools, and inadequate institutional support. Furthermore, previous research has rarely concentrated on learners with Down syndrome within specialized educational institutions while simultaneously integrating teacher capacity building, individualized assessment practices, and practical classroom-based intervention strategies into one comprehensive framework.

Therefore, the present study differs from earlier studies by moving beyond theoretical discussions of challenging behavior and introducing an applied, evidence-based assessment toolkit specifically designed for teachers at Deborah Academy. The novelty of this study lies in its focus on empowering teachers through practical training in the use of FBA, ABC charts, interviews, and contextual behavioral analysis to identify the antecedents, functions, and consequences of challenging behaviors in learners with Down syndrome. In addition, unlike earlier studies that mainly examined behavioral challenges from a diagnostic or descriptive perspective, this study aims to bridge the gap between assessment and intervention by creating culturally and contextually relevant strategies tailored to the Ethiopian special education context. The study also contributes to the field of special education by generating localized evidence on teacher-led behavioral assessment practices, promoting inclusive and individualized interventions, reducing teacher stress associated with classroom disruptions (Klassen & Chiu, 2010), and supporting improved academic and social participation for learners with Down syndrome. Consequently, the study offers a unique contribution by linking research, teacher practice, and inclusive education through a sustainable and context-

responsive intervention model that may serve as a reference for similar special and inclusive educational settings in Ethiopia and other developing countries.

To sum up, this intervention strives to close the critical gap between what we think we know and what we do to help create an atmosphere that empowers teachers at Deborah Academy who are best able to deal with difficult behaviours and to maximize the potential of their students with DS. Typically, students with DS in Deborah Academy exhibit challenging behavioral issues that interfere with learning and social environment and it challenges the student experience in a classroom at Deborah Academy. Behaviors that arise from communication difficulties, sensory processing, and frustration or from issues with sensory processing, etc., they frequently stem from a lack of insight into what triggers or functions these behaviors, but don't help to solve for them. Unfortunately, existing assessment methods do not offer the depth or context for understanding the reasons and context for such events and symptoms, so there are few to no effective interventions or help and this reinforces the fact that these may be more disruptive and stressful to the learner or their support system. So this study introduces a crucial intervention as an assessment toolkit for teachers at Deborah Academy. This toolkit would provide teachers with the understanding and training necessary to assess an individual student as a unique individual with their own set of needs a unique set of tasks for identifying the cause and effect of their challenging behavior. This better understanding will enable more targeted interventions to target the root issues rather than just the symptoms. That is how beneficial the potential outcomes are: student learning outcomes and social engagement, teacher stress and well-being, and finally a more supportive and inclusive learning environment. It could dramatically change the lives of learners with Down syndrome at Deborah Academy and, ultimately, help bring ripple effects to all in the community through addressing this problem at its source.

METHODS

Intervention Design

The intervention centered on FBA, a well-researched intervention for recognizing and addressing challenging behaviors (Stephens et al., 2013). This was consistent with established approaches to supporting individuals with Down syndrome and served as a strong basis for examining antecedents and consequences of behavior. Rather than developing a completely self-constructed tool without empirical grounding, the study adapted established FBA principles and assessment procedures from previous literature to ensure content relevance and applicability within the context of Deborah Academy. The training equipped teachers with the practical skills needed to carry out FBAs effectively. The two-week training was organized into modules. Module 1 introduced the core concepts of FBA, emphasizing its relevance and application in promoting positive behavior support and reinforcement strategies. Module 2 focused on more practice-based applications, including identifying and understanding challenging behaviors through direct observation, interviews, and record reviews; developing hypotheses based on behavioral data; and designing evidence-based interventions tailored to individual learners' triggers, motivations, and environmental conditions.

To strengthen the rigor and credibility of the study, the questionnaires and interview protocols used for data collection were developed based on existing literature related to challenging behavior, FBA practices, and special education interventions (Feeley & Jones, 2006; Moreno, 2011; Crone et al., 2015). The instruments were reviewed by experts in special needs and inclusive education to establish content validity and ensure the relevance, clarity,

and appropriateness of the items for the study context. In addition, pilot testing was conducted with a small group of teachers outside the main study setting to identify ambiguous items and improve the wording and structure of the instruments. Feedback obtained during the pilot phase was incorporated before the actual implementation of the study. Reliability of the questionnaire items was further strengthened through internal consistency checks, while triangulation of multiple data sources, including interviews, classroom observations, behavior records, and teacher reflections, enhanced the trustworthiness and dependability of the findings.

Participants

The intervention selected a specific target group: 9 (nine) teachers teaching at Deborah Academy who were directly involved in supporting students with Down syndrome who exhibited challenging behaviors. To ensure the effectiveness and relevance of the intervention, teachers with at least one year of teaching experience at the Academy were purposively selected. Educators who were already participating in separate behavior management programs or who had limited availability during the training and implementation phases were excluded to maintain consistency in participation and maximize the impact of the intervention. Although the sample size was relatively small and limited to a single institution, the study primarily aimed to provide an in-depth, context-specific exploration of the practical application of FBA within Deborah Academy. Therefore, the findings are intended to provide preliminary insights rather than broad generalizations to all special education settings. Nevertheless, the experiences and outcomes observed among the participating teachers offer valuable evidence regarding the feasibility and relevance of teacher-focused behavioral assessment interventions in similar educational contexts. Future studies may strengthen the generalizability of the findings by involving larger samples, multiple schools, and diverse educational settings across different regions.

Table 1. Demographic Characteristics of The Study Participants

No.	Pseudonyms	Sex	Educational Qualification	Teaching Experience in Year	Experience in Teaching DS
1	DAT ₁	F	First Degree	5	3
2	DAT ₂	F	First Degree	5	3
3	DAT ₃	F	First Degree	5	2
4	DAT ₄	F	First Degree	4	2
5	DAT ₅	F	Second Degree	4	2
6	DAT ₆	F	First Degree	3	2
7	DAT ₇	F	First Degree	3	2
8	DAT ₈	F	First Degree	2	2
9	DAT ₉	M	First Degree	2	2

Pseudonyms: - Deborah Academy Teacher 1, 2, 3, 4, 5, 6, 7, 8, and 9 (DAT_{1, 2, 3, 4, 5, 6, 7, 8, and 9}).

Intervention Procedure

This section outlines an introduction to the intervention process used at Deborah Academy which aims to provide teachers with tools to comprehend and manage problematic behaviours of pupils with DS. The intervention was structured as per the Toolkit for Effective Assessment:

Pre-Intervention Phase (1 Week)

An intensive planned and one-week pre-phase was executed to lay the groundwork for successful intervention. In the beginning individual consultations were carried out with the educators as a form of listening to the teacher and to find out what specific challenges they faced when handling difficult behaviours with their students with DS for example. Observations, similar to looking at a subject through a magnifying glass, revealed patterns of student behavior and the teachers' reactions. Teachers' training session offered FBA toolkit for Effective Assessment, which covered the tools, practices and practical application of the toolkit itself in making exact identification of the triggers and consequences of challenging behaviours. Finally, to set a baseline, instruments for data collection (ten pre-intervention questions) and teacher logs were meticulously maintained, which served to provide a good sense of the pre-intervention context.

Intervention Phase (2 weeks)

The intervention phase (two weeks) entailed an upbeat, participatory process of incorporating, sustaining and evaluating a range of strategies. Teachers, armed with the skills discovered from a comprehensive needs assessment and the preparation provided in the Toolkit played a key role in this process. In particular, module 2 became tactile, so that teachers could confront challenging behaviors head-on. They've gotten used to finding and analyzing these behaviors and understanding the possible effects it might produce. They accumulated essential data through an amalgam of interviews, anecdotal accounts, and observation methods. Those were the starting point on which to draw hypotheses on the causes and effects of each of these behaviours. Finally, teachers were able to design and implement evidence-based interventions: using strategies based on positive reinforcement and environmental modifications, all tailored to the specific needs of each individual based on their identified triggers and motivators. Yet teachers were not on their own when it came to this effort. Our research team was their coaches, providing regular individual and group sessions to identify challenges and skills, and facilitate learning and practice.

At the same time, efforts to track progress were also made. The data on challenging behaviors was collected weekly, as per the same instruments used in the first phase, and analyzed closely. It allowed for continuous monitoring and revision of intervention as required. The key was to assess the alignment of each component of the intervention with classroom observations and teacher interviews to ensure fidelity and to maximize the impact of the intervention. It is with the interplay of the three prongs, (implementation, support and evaluation) that an effective intervention can be established, and a potentially more positive learning experience can be achieved, both for the teachers in the intervention as well as the learners themselves.

Post-Intervention (1 week)

A week following the intervention helped cement their impact. As in the first phase, comprehensive data were collected on student behaviors from observation and teacher records. By comparing this data to the first phase, we gain a clear understanding of the effectiveness of the intervention. Discussions were facilitated with the teachers and staff of Deborah Academy to facilitate a deeper understanding. Teachers expressed their experiences and opinions on how the intervention affected student behaviour, sharing good suggestions to improve in the future. By having the final section interweaving data and the point of view of the participants, it made the intervention into a lifelong learning and improving experience, setting the groundwork for continued support and making education a more supportive learning experience for all involved.

Data Collection and Analysis

A two-step approach for data collection and analysis was applied in order to carefully measure the effect of the intervention. A ten-item questionnaire was used for data collection in the first stage, and a teacher rating was used to obtain the picture of challenging behavior before intervention and after intervention. This strategy enabled the quantitative measurement of progress and for paired sample t-test use. Omega squared (ω^2), a measure of effect size, was also used to estimate how much variation in the dependent variable is accounted for by the independent variable. This size of effect measure is particularly applicable if the sample size is less than 30, as recommended by Fritz et al. (2012) as well as, Olejnik and Algina (2003). Secondly, to further explore the lived experience, focus group discussions and semi-structured interviews elicited teachers' perspectives and insights, yielding rich qualitative data. This dual purpose analysis, statistical methods for quantitative data and thematic analysis for qualitative data, cast light on the intervention's efficacy both in terms of specific impact and perceived effects on teachers' experiences and knowledge of difficult behaviors. The intervention was well documented, and by analyzing that analysis in-depth the intervention was shown to be effective with improved quality; paving avenues for the intervention to get even better with other refinements in the future, and ensuring it continued to support both teachers and learners.

Ethical Considerations

Rigorous procedures followed throughout the research were implemented. Informed consent from participant teachers, Deborah Academy staff and parents/guardians of students provided the consent. Confidentiality of data and anonymity of participants were maintained.

RESULT

Quantitative Result

Table 2. Paired Samples t-Test Result

No	Statement	N	Mean		T	df	Sig. (2-tailed)
			Pre-Intrvn.	Post-Intrvn.			
1	I feel confident in identifying challenging behaviors in my classroom.	9	1.6667	3.6667	-5.367	8	.001
2	I understand the potential benefits of conducting an FBA for students exhibiting challenging behaviours	9	2.2222	4.2222	-4.536	8	.002
3	I am familiar with the key components of FBA	9	2.3333	4.3333	-6.928	8	.000
4	I feel comfortable collaborating with other professionals on developing and implementing interventions for students with challenging behaviors.	9	2.6667	4.5556	-4.464	8	.002
5	I believe understanding the "why" behind challenging behaviors can lead to more effective interventions.	9	2.5556	4.2222	-5.000	8	.001

6	I feel prepared to implement the FBA process based on my current knowledge and skills	9	2.5556	4.0000	-4.274	8	.003
7	I am familiar with and comfortable using data collection tools for assessing challenging behaviours	9	1.7778	4.4444	-6.047	8	.000
8	I am confident in analyzing data and identifying potential triggers and functions of challenging behaviors	9	2.4444	4.3333	-7.249	8	.000
9	I am comfortable collaborating with colleagues and specialists to develop and implement FBA-based interventions	9	2.7778	4.5556	-8.000	8	.000
10	I am optimistic that using FBA can improve student behaviour and the classroom environment	9	3.1111	4.2222	-3.592	8	.007

The Paired-Samples t-test results show that there is statistically significant increased confidence and competence of teachers in all areas of FBA related to the intervention. The first item from the listed table 2 explored the teachers' confidence in identifying challenging behaviors in the classrooms. After the intervention, an average score of 1.67 was obtained in the pre-intervention and 3.67 in post-intervention condition, suggesting an impressive increase in confidence. Results (Paired-samples t-test) indicated significant difference in these ratings ($t(8) = -5.367, p = .001$). That is to say, the intervention increased the teachers' confidence level in recognizing challenging behaviour. In addition, the second item within table 2 measured teachers' understanding of the potential benefits of doing an FBA with students showing challenging behavior. The pre-intervention mean score was 2.22, and the post-intervention mean score was 4.22. The paired-samples t-test showed a significant difference between these scores ($t(8) = -4.536, p = .002$). That means the intervention improved teachers' knowledge about the benefits of FBA.

The third element in the previous mentioned table 2 also tested the degree of familiarity of teachers with the basic elements of FBA related to the above mentioned aspects. The mean score before the intervention is 2.33; the mean score after an intervention is 4.33. T-test with paired samples results indicated a significant difference ($t(8) = -6.928, p = .000$), suggesting that teacher familiarity with FBA key elements was significantly positively enhanced by the intervention. For the fourth element of Table 2, describing the extent to which teachers were comfortable working in pairs or cohorts with colleagues to develop and implement interventions for students with challenging behavior patterns, the mean score was 2.67 before the intervention and the mean score after the intervention was 4.56. A paired-samples t test demonstrated a significant difference with regard to these scores ($t(8) = -4.464, p = .002$). This indicates that the intervention made teachers more comfort to cooperate with other professionals.

On the fifth item of table 2, on teachers' belief that understanding the reasons for challenging behaviors in the classroom may increase the effectiveness of interventions, the data observed a significant increase in confidence with regards to agreement following the intervention. Prior to the intervention, the mean score was 2.56, which increased to 4.22 post-

intervention. The paired-samples t-test showed a significantly different outcome ($t(8) = -5.000$, $p = .001$), that the intervention significantly increased teachers' confidence in the efficacy of FBA. For the sixth item in table 2, which evaluated teachers' preparedness to execute the FBA process, based on their current readiness, both the mean score before the intervention was 2.56, and after the intervention was 4.00, the level of preparedness was improved significantly. The paired-samples t-test revealed a statistically significant difference ($t(8) = -4.274$, $p = .003$), indicating that the intervention had a significant impact on teachers' readiness to implement FBA.

The ease of teachers with data collection tools to evaluate challenging behaviors was quantified in the seventh statement in table 2. The mean score before the intervention was 1.78, and mean score after the intervention was 4.44, demonstrating a substantial improvement in experience of comfort. The paired-samples t-test indicated a significant difference ($t(8) = -6.047$, $p = .000$), which means that the intervention significantly made teachers feel more comfortable with data collection tools. In addition, a further eighth item looked at teachers' confidence in analyzing data to identify such possible triggers and functions of problem behaviors. The pre-intervention mean score was 2.44, and after intervention average score was 4.33. The paired-samples t-test indicated a statistically significant difference ($t(8) = -7.249$, $p = .000$), which means the intervention significantly increased teachers' confidence in data analysis.

The ninth statement of table 2 addressed teachers' comfort in working with colleagues and specialists to develop and implement FBA-based programs. The mean score was equal to 2.78 before the intervention, meaning that we had a medium level of comfort. The intervention's mean score increased significantly to 4.56 (mean score post the intervention). The difference was significant ($t(8) = -8.000$, $p = .000$), indicating that the intervention positively influenced teachers' comfort with collaboration used in FBA interventions. Moreover, the tenth statement looked at teachers' optimism in FBA's potential to be used in a positive way to enhance student behavior and classroom environment. The pre-intervention mean score was 3.11, suggesting moderate optimism. The average score after the intervention was 4.22 and statistically significant ($t(8) = -3.592$, $p = .007$). This means that the intervention positively affected teachers' optimism regarding FBA. Overall, the paired-samples t-test yields convincing evidence that the intervention at Deborah Academy successfully enhanced teacher confidence, competence, and overall FBA-based perspective.

Table 3. Summary of Paired Samples t-Test

Table 3. Summary of Paired Samples t Test								
Paired Samples Test						T	df	Sig.(2-tailed)
Paired Differences								
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre-Intervention – Post Intervention	-18.44444	4.69338	1.56446	-22.0521	-14.8368	-11.79	8	.000

$$\omega^2 = \frac{t^2 - 1}{t^2 + n_1 + n_2 - 1} = \frac{139.0041 - 1}{139.0041 + 18 - 1} = \frac{138.0041}{156.0041} = 0.88$$

The paired-samples t-test found significant differences in the average scores between pre- and post-intervention as indicated from the result of the above table 3. Such a study indicates that the intervention offered to teachers studying FBA at Deborah Academy had a beneficial

effect on teachers' knowledge/confidence in the area of FBA. The effect size of 0.88 is defined by Omega squared (ω^2) that was regarded as a large effect size according to Fritz et al. (2012) and Olejnik and Algina (2003). This suggests that a large proportion of the variance in confidence and competence scores for teachers can be accounted for by the intervention. More succinctly, the findings indicate that the intervention was successful in enhancing teachers' knowledge and implementation of FBA. The effect size was so large that the intervention significantly altered teachers' knowledge and confidence (effect size). The paired-samples t-test and effect size results are strong indicators that the intervention achieved meaningful improvements in FBA knowledge/confidence among those teachers as demonstrated through this study.

Table 4. Intervention Schedule for Functional Behavior Assessment (FBA) Training

Module	Day	Topic	Activities	Duration
Module 1: Concepts about FBA and its understanding	1	Introduction to FBA: Importance & Alignment with Positive Reinforcement	– What is FBA? – Benefits & applications in supporting individuals with Down Syndrome – Connection with positive reinforcement strategies- Case studies & examples	2 hours
	2	Understanding the FBA Framework	– Key elements of FBA: - Student information – Target behaviors – Antecedents, concurrent events, & consequences – Observation & data collection methods (interviews, records, direct) – Influencing factors - Hypothesis development – Function of behaviour	2 hours
	3	Identifying & Characterizing Challenging Behaviors	– Defining and operationalizing target behaviors – Differentiating challenging vs. typical behaviors – Analyzing behavior patterns and triggers – Identifying potential motivators and functions	2 hours
	4	Putting It All Together: Case Studies & Practice	– Applying FBA principles to real-world scenarios – Analyzing case studies of individuals with Down Syndrome – Group discussions and collaborative problem-solving	2 hours
Module 2: Practicing FBA and steps	5	Data Collection & Analysis Techniques	– Introduction to data collection tools and methods	2 hours

need to be followed		– Practicing observation techniques: direct, indirect, and anecdotal – Learning data analysis methods: frequency, intensity, duration – Identifying antecedents, concurrent events, and consequences	
6	Using Data to Develop Hypotheses & Interventions	– Analyzing data to identify patterns and relationships – Formulating hypotheses about the function of behavior – Designing evidence-based interventions based on positive reinforcement and environmental adjustments - Tailoring interventions to individual needs and motivators	2 hours
7	Hands-on Practice with FBA Data Record Form	– Completing a simulated FBA data record form – Applying knowledge of FBA elements to case studies – Group practice and peer feedback	2 hours
8	Role-Playing & Scenario-Based Learning	– Practicing conducting FBA interviews with simulated parents/caregivers – Role-playing intervention implementation with colleagues – Discussing ethical considerations and cultural sensitivity	2 hours
9	Putting It All Together: Comprehensive FBA Case Study	– Working on a comprehensive case study from start to finish – Applying all learned skills: data collection, analysis, hypothesis development, intervention design – Group presentation and discussion of case study	2 hours
10	Wrap-up & Next Steps	– Review of key learning points and takeaways – Resources and support for ongoing implementation of FBA	2 hours

-
- Q&A and discussion of future application in practice
-

Qualitative Result

Pre-Intervention

Limited understanding:

... To be honest, I sometimes get lost when a student gets acting out. So many causes that may be behind it home life, learning difficulties. But, as I have not really been trained in how to figure out what is the root cause. We're simply instructed how to 'manage' the behavior, which feels like a sort of Band-Aid for a broader wound (DAT3).

This data emphasizes the teachers' inadequacy in comprehending the reason for student behaviour. They are not trained to do more, which results in them feeling that what they are currently doing is superficial.

Intervention Challenges:

I've experimented with different styles of behaviour management, but there isn't a single approach that seems to stick for every pupil. A positive Reinforcement system may work wonders and yet another student completely ignores the application because no one system is a one-size-fits-all approach and it can be suffocating to experiment constantly (DAT5).

This data reflects the teacher's difficulty implementing effective interventions. They recognize some need for individualized attention, but as they're overwhelmed by the lack of consistent results.

Confidence Deficit and Isolation:

Honestly, dealing with these challenging behaviors can be really discouraging. I see other teachers seemingly handle things with ease, and I feel like I'm constantly failing. There's not much opportunity to collaborate or share ideas, and that isolation just makes it worse (DAT9).

This quote reveals the teacher's low confidence and feelings of isolation. They compare themselves to others and yearn for a support system to share experiences and strategies.

Frustration with Lack of Resources:

We completely agree with feeling overwhelmed. There just aren't enough resources available to us. We need more training on behavior management strategies, smaller class sizes, and ideally, additional support staff in the classroom (FGD).

Absolutely! And access to specialists who can help diagnose learning difficulties or underlying emotional issues would be a game-changer. Right now, we're left on our own to navigate complex situation (FGD).

This data excerpt from the focus group discussion emphasizes the collective frustration with a lack of resources. Teachers express a desire for more training, smaller class sizes, and specialist support to effectively manage challenging student behaviour.

Intervention Outcomes

Empowered Educators:

The FBA training was a total boon! That is how, now I have a toolbox of strategies to build on and I can always choose appropriate tools (DAT1).

The quote demonstrates the confidence the teacher can gain from training in FBA. They're no longer confused and have a framework to look for and intervene on behavioral problems. Putting into practice & lowering the difficult behaviors:

No wonder the new strategies have transformed the classroom! It is, that much more quiet and orderly. I use a systematic method to respond to disruptions where students know what is expected of them (DAT7).

The positive shift observed through this quote that was observed in the class, shows the efficacy of the intervention. However, a consistent implementation of these strategies has resulted in less behavioral issues and less disruption to the learning environment.

Positive Teacher Experience:

Truth being told, I am so much more positive these days. The ability to cope with negative behaviors has lightened my burden on the plate. There a greater sense of collaboration from those in our department. We have shared best practices and support each other, which makes a huge difference (DAT8).

This is the story of improved teacher experience. They feel more confident, less stressed out and more supported.

Common wins and team work:

“That intervention has been a breath of fresh air! Such bright changes are being witnessed by all of us in our classrooms.” Students are a lot calmer and so much easier to concentrate on teaching and learning (FGD). “We learn from each other’s stories, and in that sense, it feels good to know we’re not alone.” As a result, this FGD section mentions the collaborative experience of the intervention. There are happy rejoicing teachers noticing the bright trends in students and themselves. The sharing strategies highlight collaboration and support among teachers.

DISCUSSION

This study assessed the effectiveness of FBA training for the teachers in Deborah Academy. Findings demonstrate strong evidence the intervention provided a substantial improvement in teachers’ confidence, skill level, and readiness to target challenging student behaviors. Paired-samples t-tests revealed statistically significant improvements in all domains measured including confidence in recognizing challenging behaviors, knowledge of the benefits of FBA, awareness of FBA elements, and comfort in partner work. Their results were consistent with previous research by Ibigbami et al. (2020) and Cortino (2020), where FBA training led to better understanding and self-efficacy in managing challenging behaviours by educators. The magnitude of the (Omega squared) effect was large, which means that the intervention exerts a substantial positive effect on teachers' knowledge and confidence in FBA. This finding supports O'Neill (2016) who found similar size effects in studies of FBA training programs for educational professionals.

Furthermore, participants' pre-intervention quotes were suggestive of feelings of incompetence and insufficient training to recognize the etiology of student behaviors among the teachers. They complained about the limitations of conventional methods of behavior management and lack of structure. These results also echo the research of Dias-Lacy and Guirguis (2017) as well as Cassady (2011) that indicated teachers were feeling overwhelmed and unprepared to manage complex student behaviors without training and support. However, the quotes gathered following the intervention reflected a major change in the attitudes of the teachers. Those who were surveyed had felt empowered by the FBA framework, which allowed them to understand the motivators for student behaviors and implement targeted interventions. This aligned with Milburn (2023) and Stafford (2023), who reported the importance of FBA training as a means by which teachers become data-driven and use this approach to behavior management to provide more effective interventions. In addition, qualitative data also revealed a positive influence on the classroom environment.

Teachers recorded significantly less challenging behaviors and a more predictable, less disruptive classroom environment. This parallels the investigations by Bunch-Crump and Lo (2017) Woodson (2022) which found reduction in disruption and enhancement of students' engagement after FBA was introduced in schools.

In addition, the intervention encouraged collaboration between teachers. In the focus group discussions, it was highlighted the importance of sharing best practices and support. The use of this collaborative approach is a key to ensure positive outcomes as emphasized in Crone et al. (2015) and Cortino (2020) that ongoing professional development and peer support is critical to supporting FBA programs' effectiveness. This study generally has shown that FBA training is very beneficial when looking for evidence of good training from the teachers, namely, confidence, competency, and effective handling of high problematic behaviours associated with students. We gave teachers methods to address systematic issues, which improved classroom climate and enhanced the experience for both students and teachers alike. The increasing amount of research support for FBA training as a useful tool for educators is substantiated by these findings.

CONCLUSION

This study aimed to examine the effectiveness of FBA training for teachers working with children with DS who demonstrate problematic behavior at Deborah Academy. Overall, the training had very positive results as teachers felt more confident, competent, and prepared to address these behaviours. They reported statistically significant gains in all the measures that were measured, including teacher confidence in recognizing challenging behaviors, knowledge of the value of FBA and familiarity with its components, and comfort collaborating with professionals. Those findings were also mirrored in qualitative data, where teachers described moving from feeling inadequate to feeling empowered with the FBA framework. The positive impact of this newfound knowledge and skill-set translated into lower disruptive behaviors and a more peaceful classroom atmosphere. These results echo prior research that has underscored the value of FBA training for teachers. This study supports the growing body of literature to suggest that FBA training is useful for teachers working with students who exhibit challenging behaviors.

LIMITATION OF THE STUDY

A limitation is the fact that the research was limited on the study focus of teachers' viewpoint and their experiences after intervention. Although the positive changes in teacher confidence and classroom climate are encouraging, the study doesn't examine whether it translates directly to any change in the performance of students. Future research should ideally reflect measures of student behaviour and academic success to capture the evidence of the intervention's impact on students' well-being more holistically.

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CONFLICT OF INTEREST

The authors have no conflict of interest with regard to this article published at the end of this conference.

AI DISCLOSURE STATEMENT

During the preparation of this manuscript, the author used Perplexity AI (online platform) to assist with language editing and improving clarity. The author(s) reviewed and revised the output and take full responsibility for the content of the article.

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