



Inclusive Strategies for Children with Autism: Behavioural Strategies

Strategie inclusive per bambini con autismo: Strategie comportamentali

Colin Calleja

Department for Inclusion and Access to Learning, Faculty of Education, L-Università ta' Malta – colin.calleja@um.edu.mt
<https://orcid.org/0000-0001-6665-4304>

Özge Boşnak

Bursa Uludag Universitesi Bursa, Turkey – ozgebosnak@uludag.edu.tr
<https://orcid.org/0000-0001-5208-9551>

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ABSTRACT

This paper provides a comprehensive review of evidence-based behavioural strategies for the successful inclusion of children with autism in general education environments. The authors emphasize the importance of creating a truly inclusive learning environment and implementing behavioural research-based strategies to support the effective inclusion of children with autism. The review includes behavioural strategies such as behavioural assessment and approaches, review and practice, direct instruction, formative assessment and feedback, and school-wide positive behaviour support. The paper is one of a series of papers reviewing inclusive strategies for children with Autism.

Questo contributo raccoglie lo stato dell'arte delle strategie comportamentali *evidence-based* per l'inclusione efficace dei bambini con autismo nei contesti di scolarità non differenziale [*general education*]. Gli autori sottolineano l'importanza di creare un ambiente di apprendimento autenticamente inclusivo e di implementare strategie basate sulla ricerca comportamentale per supportare l'inclusione efficace dei bambini con autismo. La rassegna della letteratura scientifica include strategie comportamentali quali: la valutazione e gli approcci comportamentali; la revisione e la pratica; l'istruzione diretta; la valutazione e il feedback formativi; e il supporto comportamentale positivo a livello scolastico. L'articolo appartiene a una serie di documenti che prendono in esame le strategie inclusive per bambini con autismo.

KEYWORDS

Inclusive education, General education classroom, Behavioural strategies, Children with autism
Inclusione, Classi non differenziali, Strategie comportamentali, Bambini con autismo

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1. Introduction

Autism, a neurodevelopmental disorder identifiable from early childhood, profoundly affects children's daily lives, particularly in the realms of social interaction and communication often leading to difficulties in routine functions. Characterized by repetitive behaviours, fixation on specific interests, and engagement in particular activities, autism is classified as a neurodevelopmental disorder (Diagnostic and Statistical Manual of Mental Disorders-5, 2013). The authors propose that with tailored adaptations, children on the autism spectrum can seamlessly integrate into mainstream education, actively participating alongside their same-age peers. This stance is supported by research, emphasizing the importance of inclusion as a crucial educational strategy, as highlighted by Lindsay (2007), aimed at expanding educational opportunities for students with specific needs.

Studies conducted by Crosland and Dunlap (2012), Gavalda and Qinyi (2012), as well as Li et al. (2022) have indicated that students diagnosed with autism spectrum disorders (ASD) experience positive outcomes when participating in mainstream inclusive classes with additional support. Consequently, interventions for ASD focus on both individualized and systemic approaches to promote inclusive education. This discussion addresses the need to review recent developments in research field studies that inform and advance interventions for fostering inclusivity, as highlighted by Crosland and Dunlap (2012).

This article explores effective strategies for integrating children with autism into mainstream educational settings, drawing inspiration from Mitchell's (2014) work on inclusive strategies for children with special needs. Early detection of autism significantly influences daily functioning, particularly in social interaction and communication, with characteristic repetitive behaviours and specific interest fixation. Advocating for complete inclusion, the authors cite research supporting the benefits of inclusive classrooms for students with autism spectrum disorders (ASD) (Crosland & Dunlap, 2012; Gavalda & Qinyi, 2012; Mengyao et al., 2022). Emphasizing the importance of tailored interventions, the paper delves into behavioural strategies, including behavioural assessment, direct instruction, and school-wide positive behaviour support, building on Mitchell's identified evidence-based inclusive strategies. The authors stress the need for ongoing research to further enhance inclusive education for children with autism, concluding with a discussion on future research directions in this field.

2. Methodology: identification of studies

2.1 Search Procedures

The research gathered studies by employing subject headings established as inclusive strategies by Mitchell (2014), who delineated 24 evidence-based inclusive strategies. Each of these strategies underwent an individual search during the literature review, and the resulting studies were examined within their respective categories. The research utilized the expansive HyDi database, made available by the University of Malta library service. This comprehensive database grants access to various databases, including the Education Database, ProQuest Central, Social Science Database, Springer, and EBSCOhost.

2.2 Inclusion and Exclusion Criteria

For inclusion in this extensive review, each article underwent assessment based on multiple criteria. Firstly, the article needed to outline the utilization of an evidence-based intervention for at least one participant diagnosed with autism spectrum disorder (ASD). Secondly, the articles were required to incorporate at least one inclusive strategy. Thirdly, the research had to be executed within an inclusive setting and presented in the English language. Lastly, the articles had to be authored after the year 2010. Consequently, 36 studies meeting these criteria were identified and subjected to evaluation in this study.

3. Results

3.1 Strategy 1: Behavioural assessment and approaches

Behavioural interventions often include indirect elements that enable the achievement of targeted goals, such as emotional education, emotion expression, and emotion recognition. These intermediary components differentiate behavioural interventions from conventional behavioural interventions, which directly address the specific behaviours through education or behaviour modification (Schieltz et al., 2022). Studies on this topic conducted with children with autism since 2010 are summarized in *Table 1*.

Author(s), year	Sample	Age	Design	Intervention	Findings
Carpenter., et al., 2020	104 children (5 Female, 17 male children with autism)	16-31 months	Quantitative	Tablet-based behavioural assessment for eliciting and detecting one type of risk behaviour	Computational coding of facial movements and expressions via a tablet-based assessment can detect differences in affective expression, one of the early, core features of ASD.
Fears., et al., 2023	35 children (16 children with normal development, 16 male, 3 female children with autism)	6-43 months	Mixed-effects model	Imitative gesturing between autistic and neurotypical development during human-robot interaction	Autistic individuals imitated the robot less accurately and used less work at the shoulder compared to neurotypical individuals.
Geier., et al., 2012	54 children with autism	2-16 years old	Prospective cross-sectional	Systematically and quantitatively, examines health, physical and behavioural problems	Eating problems, behavioural problems, and obsessive-compulsive behaviours, were reported by the parents to be the most serious and problematic.
Gillis., Callahan., Raymond, and Romanczyk., 2011	77 children (48 children with autism and 29 children without ASD)	2-12 years old	Quantitative	Development of the Behavioural Assessment of Social Interactions	The BASYC (Behavioural Assessment of Social Interactions in Young Children) was primarily developed for the clinical practitioner or educator to use as part of the intervention planning and monitoring process for children with ASD.
Hoch., Moore., McComas., and Symons., 2010	1 boy with autism	7 years	Single Subject Experimental Analysis	Test the feasibility of an integrative biobehavioural analysis approach to examine the role that arousal played in choice of activities	Sequential analysis showed that activity choice and HR (heart rate) were significantly associated (i.e., activity choice sequentially dependent with the preceding level of HR).
Van Laarhoven., et al., 2021	5 young men	19-21 years	Pre-assessment screening phase using direct observation	Using Wearable Biosensor Technology in Behavioural Assessment	Wearable physiological biomarker technology can be a useful and complementary tool when conducting behavioural assessments, particularly for individuals with limited verbal repertoires.
Parsons., et al., 2012	3 men with autism	22-41 years old	Alternating treatments design	Potential Targets for behavioural assessment and intervention (Identifying indices of happiness and unhappiness among adults with autism)	All three participants displayed more happiness indices in the happiness situation relative to the unhappiness situation.
Schieltz., et al., 2022	199 children with ASD	18 m-12 y	Descriptive	Behavioural assessment and treatment via telehealth	These results demonstrate the effectiveness of the telehealth model for addressing the challenging behaviour needs of children with ASD globally and highlight areas in need of additional evaluation (e.g., drop-outs, cancellations) to determine the conditions under which telehealth could be best used.
de Vaan., et al., 2015	7 boys and 11 girls with ASD	11-50y	Observation	Behavioural assessment	Observation of autism in people with sensory and intellectual disabilities showed high inter-rater reliability, internal consistency of scales, and content and construct validity.

Table 1. Behavioural assessment and approaches articles.

In the analysis of the conducted studies, the cohort comprised 369 individuals diagnosed with autism spectrum disorder. Among these, 49 were identified as male, 19 as female, and 301 lacked gender specification. The age distribution within the cohort ranged from 6 months to 50 years for individuals diagnosed with autism.

Upon reviewing the methodological approaches employed in these studies, one investigation adopted a two-group descriptive design, as reported by Schieltz et al. in 2022. In contrast, another study utilized observational methods, as documented by de Vaan et al. in 2015. Interestingly, both studies implemented identical interventions, as indicated by Schieltz et al. in 2022 and de Vaan et al. in 2015. On the other hand, additional studies employed quantitative methods, as documented by Carpenter et al. (2020) and Gillis, Callahan, Raymond, and Romanczyk (2011), both focusing on the assessment process. Other methodological approaches encompassed a mixed-effects model (Fears et al., 2023), prospective cross-sectional design (Geier et al., 2012), single subject experimental analysis (Hoch, Moore, McComas, and Symons, 2010), pre-assessment screening phase using direct observation (Van Laarhoven et al., 2021), and alternating treatments (Parsons et al., 2012). Among the articles, certain studies compared children with autism to those with normal development (Carpenter et al., 2020; Fears et al., 2023; Gillis, Callahan, Raymond,

and Romanczyk, 2011). Furthermore, within articles involving behavioural assessments, some studies integrated innovative technologies (Fears et al., 2023; Van Laarhoven et al., 2021).

3.2 Strategies 2 and 3: Review and practice and direct instruction

Facilitating and overseeing recurrent opportunities for learners to encounter identical skills or concepts is imperative for the examination and application of instructional strategies. This practice holds prominence within the framework of direct instruction. Direct instruction (DI) stands as a comprehensive educational strategy, aiming to cultivate student mastery through proactive engagement and interactions with the instructor (Bereiter & Engelmann, 1966; Engelmann, 1980). DI encompasses both curricula, delineating what is to be taught, and procedures, detailing how the instructional process unfolds. The intended utilization of DI involves its implementation within a classroom setting, facilitated by a qualified educator or paraprofessional (Cadette et al., 2016). A compilation of studies addressing this instructional approach in the context of children with autism, conducted since 2010, is presented in *Table 2*.

Author(s), year	Sample	Age	Design	Intervention	Findings
Banda & Hart., 2010	2 girls with ASD	8y	Multiple base-lines across participants	Peer-to-peer social skills through direct instruction	Results indicated increased social initiations in both participants and sharing behaviours in one of the participants, but no increases in responses in both participants.
Cadette., et al., 2016	3 boys with ASD	15-17y	Multiple base-lines across behaviours	Direct instruction on answering "wh-" questions	Using a multiple probe design across behaviours, results indicated the participants mastered two of the three "wh" question types and made progress with the remaining question type.
Flores., et al., 2013	18 boys with ASD	7-13y	Curriculum-based assessment	Direct instruction on reading comprehension and language skills.	One-way analyses of variance indicated that there were significant differences in students' skills over time.
Flores and Ganz., 2014	13 children with ASD	4-10 y	Pre-test/ Post-test	Language intervention	t-test indicated that there was a statistically significant difference in student performance for the group who received direct instruction.
Flores, Schweek and Hinton., 2016	3 male, 1 female children with autism	4y	Multiple probe across language behaviors	Language intervention using Direct Instruction	12 weeks of instruction, resulting in improved language skills
Frampton., et al., 2020	3 boys with ASD	10-15y	Multiple probe designs across participants	Feasibility and preliminary efficacy of direct instruction	The students demonstrated improved performance, positive affect, and overall timely completion of exercises. Taken together, these findings suggest that DI may be feasible for some students with ASD who utilize Speech Generating Devices.
Head., et al., 2018	2 boys and 1 girl	10-16y	A multiple-probe across behaviors	Direct instruction on reading comprehension	The findings of this study support the efficacy of DI for students with autism and will eventually help establish DI as an evidence-based practice for this population.

Kamps., et al., 2016	53 boys and 9 girls	5-6y	Descriptive	Direct instruction using the Reading Mastery	All participants met the criteria as beginning readers, based on assessments at the beginning and middle of Kindergarten.
Shillingsburg., et al., 2014	15 boys and 3 girls with ASD	4-12y	Pretest-Posttest	Direct Instruction Language for learning curriculum	Comparing language skills across groups, children already exposed to the intervention exhibited significantly higher language skills than their non-exposed waitlist counterparts.
Thompson., Wood., Test., and Cease-Cook., 2012	3 male with autism	6-8y	Multiple probe designs across participants	Direct instructions on telling time	Functional relation between direct instruction and student's ability to tell time to the five-minute increment using analog clocks.
Thompson., et al., 2019	3 boys and 1 girl with ASD	7-10y	Multiple baselines across students	Small group direct instruction	Results indicated a functional relation between the intervention and student response.
Wolfe., et al., 2018	2 boys with ASD	4-7y	Multiple baselines across language skills.	Language for learning for producing generalization	Results indicate that Language for Learning was effective in producing generalizations to untrained visual stimuli and to a novel instructor for one skill, but that responding was tightly controlled by the specific sequence of verbal instructions used within the curriculum for other skills.

Table 2. Review and practice and direct instruction articles.

Upon evaluating these studies, it is discerned that a total of 135 individuals diagnosed with autism participated, comprising 105 males and 17 females. The age range of the involved children with autism spanned from 4 to 17 years.

An examination of the methodologies employed in the studies reveals that four of them adopted the approach of employing multiple baselines across participants (Banda & Hart, 2010; Frampton, et al., 2020; Thompson., Wood., Test., and Cease-Cook., 2012; Thompson, et al., 2019). Meanwhile, three studies employed multiple baselines across behaviours (Cadette et al., 2016; Flores, Schweek and Hinton., 2016; Head, et al., 2018; Wolfe, et al., 2018). One study utilized a curriculum-based assessment (Flores et al., 2013), and another study applied a descriptive design (Kamps et al., 2016). Additionally, a pre-test/post-test design was employed in one study (Flores and Ganz., 2014; Shillingsburg, et al., 2014). Predominantly, the studies featured a single-subject design. Commonly, direct instruction was implemented across diverse skills such as language learning (Flores and Ganz., 2014; Flores, Schweek and Hinton., 2016; Wolfe et al., 2018), social

skills (Banda & Hart, 2010), and time-telling proficiency (Thompson., Wood., Test., and Cease-Cook., 2012).

3.3 Strategy 4: Formative assessment and feedback

Formative assessment serves the purpose of monitoring student learning progress and furnishing ongoing feedback that proves beneficial for both students and educators in refining instructional methods. Specifically, formative evaluations aid students in recognizing their areas of proficiency and areas that necessitate improvement, prompting a targeted focus on enhancement. In contrast, summative assessments are designed to appraise student learning by assessing it against a predetermined benchmark or standard upon the completion of a unit of instruction (Tay & Kee, 2019). In accordance with the stipulated criteria for the article search, only a single study met the specified parameters. The abstract of this identified article is presented in *Table 3*.

Author(s), year	Sample	Age	Design	Intervention	Findings
Aidonopoulou-Read, 2019	2 female, 3 male with autism	?	Video observation	Examine the impact of a modified formative assessment model	The introduction of engaging resources improved engagement, but tangible rewards had a negative effect on attainment. Praise had a positive effect on engagement and attainment.
Clawson et al., 2014	4 female, 34 male with autism and 5 female 26 control participants	8-18y	Quantitative	Observation of error-related feedback by others	Findings suggest that the social context of the task and motivational significance of the confederate's performance did not limit feedback processing in ASD.
Gunby and Rapp., 2014	1 female, 2 male with autism	5-6y	Nonconcurrent multiple baseline design across participants	Behavioral skills training with in situ feedback on safe responding	BST with in situ feedback can be used to teach safe responding to abduction lures presented after a high-p request sequence
Haq., et al., 2017	1 male, 1 female with autism	6-10y	Alternating treatments design embedded within a multiple probe design across stimulus sets	Efficacy of instructive feedback	The efficacy of instructive feedback may depend, in part, on learners' behavior during instructive feedback, such as attending and echoic behavior.
Mackey and Nelson., 2015	2 male with autism	19y	Multiple-probe design across targeted job behaviours, replicated across two participants	Video feedback (VFB) in improving the job-related behaviours	The use of VFB is one way that job-related behaviours of adolescents with ASD and other disabilities can be positively influenced.
Morton., et al., 2023	3 male with autism	4-5y	Multiple baseline across participants	Play responses following instructive feedback	Effectiveness of teaching facts to individuals with ASD, and that using instructive feedback during fact training can help promote the acquisition of play skills.
Reed., 2023	24 male 4 female with autism and 21 male 7 female with typically developing children		Quantitative	Interference from previous verbal feedback	There was little difference of feedback type on initial set learning, but children with ASD exhibited difficulty in shifting this initial learning, which was worse when verbal feedback was used. This is a novel finding that has implications for slower set-shifting and for teaching strategies.
Tay., and Kee., 2019	1 male, 5 female teachers, and 5 male 1 male student with ASD	10-14y	Case-study	Effective questioning and feedback	The study identified three important characteristics of effective questioning and feedback for such students: addressing their cognitive needs (e.g., precise and direct questions); attending to their socio-emotional needs (e.g., affirmative feedback); and using support structures (e.g., visual cues).
Tullis., Marya., and Shillingsburg., 2019	1 male with autism	6y	A multiple-probe design across stimulus sets	Enhancing Instruction via Instructive Feedback	The results of the current investigation are promising, and these data may lead to meaningful extensions that further enhance both IF (instructive feedback) and AAC (augmentative or alternative communication) methodologies for people with ASD.
Unruh., et al., 2021	20 female, 89 male with autism and 28 female, 73 male typically developing controls	Range 5-29y	Quantitative	Initial action output and feedback-guided motor behaviours	Relative to controls, individuals with ASD showed similar accuracy of initial grip force but reduced accuracy of saccadic eye movements specific to older ages of our sample.
Wei., and Machalicek., 2021	2 males with autism	4-9y	multiple-baseline single-case experimental design across interventionists and children	Delayed video-feedback and pyramidal training	Each of the three paraprofessionals demonstrated an immediate increase in their implementation fidelity of incidental teaching strategies after the introduction of the training.

Table 3. Formative assessment and feedback articles.

The research engaged a cohort comprising 199 participants diagnosed with autism, alongside 6 teachers. Among the participants, 37 were male, and 162 were female, with ages ranging between 4 and 18 years. There were also 160 children with typically development which were 40 female and 120 male.

Upon scrutinizing the interventions employed in the studies, it is evident that two of them incorporated video feedback (Mackey and Nelson, 2015; Wei and Machalicek, 2021). In contrast, three studies utilized instructive feedback (Haq et al., 2017; Morton et al., 2023; Tullis, Marya, and Shillingsburg, 2019). The remaining studies embraced diverse feedback models, including modified formative assessment (Aidonopoulou-Read, 2019), error-related feedback (Clawson et al., 2014), situ feedback (Gunby and Rapp, 2014), previous verbal feedback (Reed, 2023), questioning and feedback (Tay and Kee, 2019), and feedback-guided motor behaviours (Unruh et al., 2021).

Upon reviewing the methodological approaches utilized in these studies, it is evident that the majority employed a single-subject experimental design (Gunby and Rapp, 2014; Haq et al., 2017; Mackey and Nelson, 2015; Morton et al., 2023; Tullis, Marya, and Shillingsburg, 2019; Wei and Machalicek, 2021). Additionally, a quantitative design was employed in three studies (Clawson et al., 2014; Reed, 2023; Unruh et al.,

2021). One study utilized video observation (Aidonopoulou-Read, 2019), and another adopted a case-study approach (Tay and Kee, 2019). Upon evaluating the research findings, it becomes evident that formative assessment consistently yields positive results.

3.4 Strategy 5: School-wide positive behaviour support

Contemporary research has demonstrated the efficacy of the Positive Behaviour Support (PBS) method in fostering positive outcomes for young children exhibiting disabilities and challenging behaviours (Carr et al., 1999; Dunlap, 2006). PBS, as elucidated by Javaid et al. (2020), is a systematic approach designed to impart more suitable behavioural patterns while furnishing the requisite contextual support to curtail inappropriate behaviour among children grappling with behavioural challenges. Emphasizing the importance of collaborative efforts between families and educational institutions in devising and sustaining interventions for children diagnosed with autism has been underscored in the literature. *Table 4* encapsulates an overview of studies conducted since 2010, focusing on interventions for children with autism.

Author(s), year	Sample	Age	Design	Intervention	Findings
Alwahbi., 2022	31 male with Autism	8-13y	Multiple baselines across classrooms	Virtual positive behaviour support	School-wide positive behaviour support can be successfully applied to different educational settings and suggest several implications for special and general education schools.
Javaid., et., al., 2020	1 boy with ASD	18y	Case study	Positive behaviour support plan for challenging behaviour	Personal demands and wishes of individual patients, with the PBSP, specifically tailored toward their needs and conducted at an appropriate pace.
Mouzakitis., et al., 2015	8 boys with ASD	6-10y	A multiple-baseline design across teachers with changing conditions	Self-monitoring and performance feedback	Findings illustrated idiosyncratic responding in that one teacher established and maintained high levels of TI with SM alone, two required the addition of PFB but subsequently maintained TI with SM alone, and one teacher required the combined treatment package to be successful.

Table 4. School-wide positive behaviour support articles.

Upon evaluating the referenced studies, it is discerned that a cohort of 40 individuals diagnosed with autism participated in the research endeavours. The entirety of the participants comprises male subjects, with ages ranging from 6 to 18 years within the cohort of children with autism. An examination of the research methodologies reveals that Javaid et al. (2020) employed a case study design in one study, while Mouzakitis, et al. (2015) and Alwahbi (2022) employed a single-subject design in another. These investigations encompassed diverse skill domains; specifically, Javaid et al. (2020) focused on challenging behaviour,

Mouzakitis, et al. (2015) concentrated on self-monitoring techniques and Alwahbi (2022) used virtual positive behaviour support. The outcomes of the research indicate the effectiveness of the interventions implemented in addressing the targeted issues.

4. Conclusion

In summary, this academic paper scrutinizes studies investigating diverse behavioural strategies and their impact on the daily life and functioning, particularly

in the realms of social interaction and communication, among individuals with autism. The authors posit that the implementation of such strategies holds the potential for the complete inclusion of children with autism in mainstream education. Aligning with Lindsay's (2007) emphasis on inclusion, the paper explores specific strategies aimed at supporting the successful inclusion of children on the autism spectrum.

The meticulously outlined research methodology employed a systematic approach, utilizing the HyDi database to identify studies, and adhering to rigorous inclusion and exclusion criteria. Results are systematically presented under distinct inclusive strategies, accompanied by a comprehensive examination of studies conducted post-2010.

In conclusion, this paper contributes significant insights to the field of inclusive education for children with autism, advocating for customized strategies to facilitate their seamless integration into mainstream educational environments. The rigorous literature review, methodological precision, and in-depth exploration of specific strategies collectively provide an invaluable resource for educators, researchers, and policymakers. The paper concludes by underscoring the imperative for continued research in this domain, recognizing the dynamic nature of interventions and the perpetual demand for evidence-based practices to enrich the educational journey of children with autism.

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