(REVIEW ARTICLE)

ABA Outside the Spectrum: A Systematic Literature Review

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Abstract

Applied behavior analysis (ABA) is well known to be an empirically approved intervention for individuals with autism spectrum disorder (ASD). However, its application extends well beyond autism and developmental disabilities. Despite this broader relevance, the use of ABA within mental health contexts remains underrepresented and poorly synthesised in the literature. This systematic literature review focuses on application of ABA principles and interventions in mental health populations, excluding individuals with autism spectrum disorder or primary cognitive delays. A total of 27 peer-reviewed experimental studies published between 1970 and 2023 were included. Articles were analysed across multiple dimensions, including participant age and diagnosis, treatment setting, intervention type, dependent variables, outcomes, and evidence of generalisation and maintenance. The literature reviewed included a range of mental health diagnoses ranging from depression, substance use disorders, schizophrenia, bipolar disorder, and emotional and behavioural disorders and they were carried out inpatient, outpatient, school as well as laboratory settings. Findings indicate that ABA-based interventions—such as contingency management, reinforcement procedures, behavioural activation, functional analysis, and skills training—were consistently associated with reductions in challenging behaviours and increases in adaptive functioning across age groups. Importantly, several studies demonstrated the effectiveness of ABA when delivered as a complementary component within multidisciplinary treatment packages, enhancing both short-term outcomes and long-term maintenance. Though these results are encouraging, there is still limited literature with wide variation in participant attributes, intervention components, and timing of engagement. Practice implications, the limitations of current research, and future research directions are described. This review highlights the potential of ABA as a complementary, person-centred, and empirically grounded approach within mental health services, challenging the misconception that its utility is confined to autism-related interventions.

Keywords: Mental health; Applied behavior analysis; Substance abuse; Depression

1   Introduction

Mental health disorders represent a significant and growing public health concern across the lifespan. According to the National Alliance on Mental Illness (NAMI), approximately one in five adults experience a mental illness each year, one in twenty experience a serious mental illness, and one in six children and adolescents aged 6 to 17 are affected by a mental health disorder annually. Alarmingly, suicide is the second leading cause of death among individuals aged 10 to 14 (NAMI, 2023). In parallel, the Centers for Disease Control and Prevention (CDC) reported that in 2021 alone, mental health disorders accounted for 57.2 million visits to physician offices and 6.2 million emergency department visits where mental, behavioral, or neurodevelopmental disorders were the primary diagnosis (CDC, 2022). Given the prevalence, complexity, and societal impact of mental health disorders, the need for effective, accessible, and empirically supported interventions is substantial.

Applied behavior analysis (ABA) is a scientific discipline in which principles of behavior are applied systematically to improve socially significant behavior, with experimental methods used to identify the variables responsible for behavior

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change (Cooper et al., 2007). Rooted in the experimental analysis of behavior pioneered by B. F. Skinner, ABA has been widely applied to address a range of socially meaningful behaviors (Skinner, 1963). Though the context of ABA is more commonly used in intervention processes for those diagnosed with autism spectrum disorder and other developmental disabilities, the principles of ABA and its scientific tools stretch far beyond this population (BACB, 2023). Skinner's later work laid the philosophical and theoretical groundwork for a behavioral analysis of emotion, opening the door for the application of behavioral principles to mental health phenomena such as anxiety and depression (Friman et al., 1998).

A core tenet of ABA consists of the need for parsimony and the selection of its intervention target based on its social implications; i.e., the behavior is targeted for change on account of its social value to the person and the environment (Baer, Wolf, & Risley, 1968). This focus on socially significant outcomes has been one of the main characteristics of the field's evolution. From a behavioral perspective, emotional terms such as 'anxious' or 'depressed' are understood within the context of functional relations between behavior and environmental variables; Skinner (1963) has argued that such expressions must be understood in relation to the historical and situational contexts in which they were used. Further building on this foundation, Ferster (1973) demonstrated the utility of behavior analytic approaches in the treatment of depression, noting that depression is characterized by deficits in adaptive behavior and reduced contact with reinforcement—features that render it particularly amenable to behavioral intervention.

Behavior analytic strategies such as antecedent manipulation, reinforcement, and skills training have clear relevance to mental health treatment. Antecedent-based interventions, for example, aim to modify environmental conditions that set the occasion for maladaptive behavior, thereby increasing the likelihood of adaptive alternatives (Harvey et al., 2009). Similarly, Behavioral Activation (BA), a parsimonious intervention grounded in operant conditioning principles, has demonstrated effectiveness in the treatment of depression by increasing engagement with positive reinforcement and values-consistent activity (Ekers et al., 2014). Notably, BA has shown comparable outcomes to more complex interventions such as cognitive behavioral therapy (CBT), often with fewer techniques and shorter timeframes, highlighting the potential efficiency of behaviorally informed approaches.

Despite a robust evidence base supporting ABA for autism and developmental disabilities, comparatively less synthesized research exists regarding its application to mental health populations. This is striking given that some of the earliest applied behavior analytic research was conducted in psychiatric hospitals, where operant procedures such as token economies, reinforcement systems, and extinction were used to address severe mental disorders, including schizophrenia (Harvey et al., 2009). Over several decades, behavioral interventions have demonstrated effectiveness in improving social, vocational, and self-care skills while reducing behaviors such as aggression, delusional speech, and disruptive behavior across institutional and community-based settings. Nevertheless, behavior analytic approaches are frequently underutilized or replaced by interventions with weaker empirical support, limiting access to potentially effective treatments for individuals with mental health disorders (Harvey et al., 2009).

Given the demonstrated utility of behavioral principles and the ongoing mental health crisis, there is a clear need to examine the role of ABA within mental health services. Accordingly, the purpose of the present systematic literature review is to synthesize research examining the effectiveness of applied behavior analytic interventions for individuals with primary mental health diagnoses, including depression, anxiety, schizophrenia, bipolar disorder, and substance use disorders, excluding individuals with autism spectrum disorder or primary cognitive disabilities. Specifically, this review evaluates studies that report reductions in maladaptive behaviors and improvements in adaptive functioning among youth, adolescents, and adults. By consolidating this body of research, the review aims to clarify the potential of ABA as a complementary, person-centered, and empirically grounded approach within mental health treatment, while challenging the misconception that its utility is confined to autism-related interventions.

While applied behavior analysis has a well-established empirical foundation and a documented history of use within mental health contexts, the existing literature remains fragmented, spanning multiple decades, settings, and diagnostic groups. As a result, there is limited synthesis regarding how ABA principles have been operationalised outside of autism spectrum disorders, the contexts in which they have been applied, and the extent to which outcomes have been demonstrated, maintained, and generalised across mental health populations. A systematic examination of this literature is therefore warranted to clarify the scope, characteristics, and effectiveness of behavioral analytic interventions within the mental health domain.

To address this gap, the present study employs a systematic literature review methodology guided by PRISMA standards to identify, evaluate, and synthesise experimental research examining the application of ABA interventions to individuals with primary mental health diagnoses. The following Methods section outlines the inclusion criteria, search procedures, and analytic framework used to ensure a rigorous and transparent review process, providing the foundation for the results and discussion that follow.

2   Method

2.1   Inclusion Criteria

A systematic literature review was conducted to examine the application of Applied Behavior Analysis (ABA) interventions and principles with populations whose primary diagnosis was a mental health disorder, excluding individuals with autism spectrum disorder or other cognitive disabilities as a primary diagnosis. The review was conducted using the EBSCO database.

To be included, studies were required to:

- Employ an experimental design
- Implement an intervention grounded in ABA principles
- Target participants with a primary mental health diagnosis (e.g., bipolar disorder, conduct disorders, substance use disorders)
- Address a socially significant behaviour
- Be peer-reviewed, published in English, and published between 1970 and 2023

Studies were excluded if they:

- Focused primarily on autism or intellectual/developmental disabilities
- Were literature reviews, theoretical papers, or non-experimental studies
- Included participants with diagnoses unrelated to mental health

This inclusion strategy was designed to identify empirical research demonstrating the application of ABA beyond the autism spectrum, specifically within mental health contexts.

2.2   Search Procedure

The systematic review was conducted in accordance with the PRISMA guidelines (Moher et al., 2009), which involve four stages: identification, screening, eligibility assessment, and inclusion.

The primary database search was conducted using EBSCO, covering publications from 1970 to 2023. The following search strings were used:

- ("applied behavior analysis" OR "ABA" OR "applied behaviour analysis") AND "mental health" NOT "autism"
- ("mental health disorders" OR "depression" OR "substance abuse") AND "applied behavior analysis"
- ("substance abuse" OR "substance misuse" OR "SUDs") AND "applied behavior analysis" NOT "autism"

The initial search yielded 942 records, of which 74 duplicates were removed, leaving 868 unique articles. Titles and abstracts were screened, resulting in the exclusion of 793 articles that did not meet inclusion criteria due to non-experimental design, non-mental-health populations, autism or cognitive disability diagnoses, non–peer-reviewed status, or non-English language. This process yielded 75 articles for full-text review.

Following full-text screening, 62 articles were excluded for failing to meet experimental design criteria, including participants with comorbid autism diagnoses, focusing on non–mental health outcomes, or being published in a language other than English. Reference list searches for the remaining studies identified an additional 93 potential articles. After the removal of 34 duplicates, 70 additional articles were reviewed in full. Of these, 43 were excluded for failing to meet inclusion criteria.

In total, 27 articles met all inclusion criteria and were included in the final review. Reasons for exclusion are summarised in Table 1, and the study selection process is illustrated in the PRISMA flow diagram (Table 2). A summary of outcome measures is presented in Table 3.

2.3   Measures and Data Extraction

Each included study was analysed across multiple dimensions, including:

- Number of participants

- Participant age and diagnostic characteristics
- Treatment setting
- Experimental design
- Dependent and independent variables
- Outcomes, maintenance, and generalisation

Data extraction was conducted by the primary researcher using a structured review framework

2.3.1 Participants

Demographic data were collected for each study, including the number of participants, participant age, and primary diagnosis. Participants were categorised into three age groups:

- Youth (ages 3–12)
- Adolescents (ages 13–21)
- Adults (ages 22–90)

Primary diagnoses were categorised as addictive disorders, schizophrenia-spectrum disorders, depressive disorders, bipolar disorders, and other identified mental health conditions.

2.3.2 Setting

Treatment settings were categorised into four groups:

- Inpatient facilities, including residential psychiatric units and hospitals
- Day treatment programmes, providing intensive outpatient care
- Outpatient clinics, including addiction and mental health services
- Laboratory settings, typically university-based clinical environments

2.3.3 Dependent Variable

Dependent variables differed from study to study but consistently related to an increase or decrease in socially important behaviours. Delusional speech, substance use, self-control, social skills, depressive behaviours, and gambling-related behaviours were among target behaviours, among others.

2.3.4 Independent Variable (Interventions)

Independent variables consisted of behaviour-analytic interventions, including but not limited to:

- Contingency management systems
- Response-cost procedures
- Behavioural activation
- Extinction and reinforcement strategies
- Token economy systems

All interventions were required to be grounded in established ABA principles.

2.3.5 Outcome and Generalization

Outcome data were collected based on reported behavioural change, assessed using predefined mastery criteria, graphical data analysis, or author interpretation. Studies were evaluated for evidence of maintenance and generalisation, including the duration and conditions under which behavioural change was sustained.

Social validity was also assessed, consistent with Wolf's (1978) framework, examining:

- The social significance of intervention goals
- The appropriateness of intervention procedures
- The social importance of outcomes achieved

2.3.6   2.3.6.   Experimental Design

All included studies utilised single-subject experimental designs, with the majority (approximately 90%) employing reversal designs. Design type was recorded for e n ach study to support methodological comparison.

3   Results

3.1   Number of Articles

A total of 27 peer-reviewed articles published between 1970 and 2023 met the inclusion criteria and were included in this review. All studies examined the application of Applied Behavior Analysis (ABA)–based interventions to address challenging behaviours associated with mental health diagnoses.

3.2   Participants

Across the 27 studies, a total of 564 participants were included. Sample sizes ranged from single-case designs (n = 1) to larger group studies of up to 200 participants, with a mean of approximately 7 participants per study, reflecting the predominance of single-subject methodologies.

Participant ages were categorised into three subgroups:

- Youth (ages 3–12)
- Adolescents (ages 13–21)
- Adults (ages 22–90)

Nine studies (33%) primarily included youth participants; three studies (8%) focused on adolescents, and sixteen studies (59%) involved adult participants.

Reported diagnoses varied across studies. Six studies included participants with substance use or addiction-related disorders. Five studies involved participants diagnosed with schizophrenia and/or delusional disorders, while an additional five studies included participants with emotional and/or behavioural disorders. Three studies focused on depressive disorders, two included participants with ADD/ADHD/ODD diagnoses, and one study reported participants with multiple unspecified mental health diagnoses.

3.3   Setting

The majority of studies (51%) were conducted in clinic, outpatient, or laboratory settings. A further 30% took place in inpatient or residential facilities, while 19% were conducted in school settings.

3.4   Experimental Design

Single subject designs were used across 100% of the studies included in this literature review.

3.4.1   Intervention Implemented

A range of behavioural interventions were implemented across the included studies. Twenty-one studies (78%) evaluated stand-alone interventions, while six studies (22%) implemented interventions as part of a treatment package.

Interventions were categorised by type:

- Reinforcement-based procedures were used in 12 studies (44%), including:

    - Differential Reinforcement of Alternative Behaviour (DRA) in 4 studies
    - Noncontingent Reinforcement (NCR) in 3 studies
    - Differential Reinforcement of Other Behaviour (DRO) in 3 studies
    - Shaping procedures in 2 studies

- Contingency management procedures were utilised in 10 studies (37%). Of these, 7 studies (70%) implemented individual contingencies and 3 studies (30%) employed group contingencies.

- The remaining 5 studies (19%) implemented skills-based interventions, including:

- o Behavioural activation techniques (2 studies)
- o Social skills training (2 studies)
- o Enhanced choice procedures (1 study)

3.5   Outcomes

Across all studies, the primary dependent variable was a reduction in behaviours that challenge, including aggression, self-injury, delusional speech, and substance use. All studies (100%) demonstrated reductions in targeted problem behaviours following intervention.

In addition, many studies measured increases in adaptive or desirable behaviours, such as self-control and positive social interactions. Of the 27 studies reviewed, 24 studies (89%) reported increases in targeted desirable behaviours.

3.6   Synthesis of Findings

Across the 27 studies reviewed, the findings indicate that ABA-based interventions have been applied beyond autism to a range of mental health–related behaviours, resulting in reductions in challenging behaviour with frequent increases in adaptive functioning. The focus on single subjects and low sample size is consistent with methodological traditions of ABA studies, by which functional relations at an individual level may be shown in a less generalised way than in other studies. Interventions were most implemented in clinical or controlled settings, with comparatively fewer studies conducted in naturalistic or community environments, highlighting a gap between experimental efficacy and real-world application. Although the vast majority of interventions were based on reinforcement or contingency-based procedures, a minority of studies featured skills like behavioural activation and enhanced choice, indicating some early shift towards skills-based and autonomy-supportive approaches. Notably, few studies explicitly addressed trauma, comorbidity, or participant agency, despite the prevalence of complex mental health presentations across age groups. Collectively, the literature highlights effective behaviour intervention but also indicates areas of conceptual and ethical concern around context, generalisation and participant-centred delivery - limitations that demonstrate the importance of trauma informed and strengths-based extension to these types of behaviour-based interventions in community contexts.

4   Discussion

This systematic review examined 27 empirical studies that applied Applied Behavior Analysis (ABA) principles and interventions to address behaviours associated with mental health diagnoses outside of the autism spectrum. At a time of continuing mental health crisis, these works contribute critical evidence that ABA can be used beyond the autism framework and can apply to the whole population - to patients with different, complex mental health presentations. Collectively, the reviewed studies indicate that ABA procedures can effectively reduce behaviours that challenge while also promoting adaptive, socially significant behaviours across a range of diagnoses, ages, and settings.

Importantly, the findings suggest that ABA principles are particularly well suited to integration within multidisciplinary treatment approaches. Rather than functioning as stand-alone interventions, behavioural strategies frequently enhanced the effectiveness and durability of other therapeutic modalities, supporting more comprehensive and person-centred care. This corresponds to current demands for an integration of mental health treatment philosophy that emphasises functional outcomes, skill development, and quality of life.

4.1   Contingency Management and Multidisciplinary Treatment

One of the most robustly supported ABA-based interventions identified in this review was contingency management (CM), particularly in the treatment of substance use disorders. CM procedures, which systematically reinforce desired behaviours through incentives, demonstrated consistent effectiveness across studies. For example, Epstein et al. (2003) measured CM as a stand-alone intervention and as part of a treatment package that included cognitive behavioural therapy (CBT) in patients receiving methadone maintenance. While immediate reductions in cocaine use were associated by CM alone, participants who received CM in conjunction with CBT were more likely to sustain abstinence at a one-year follow-up. These findings highlight the value of CM not only as an effective intervention in its own right, but also as a mechanism for strengthening and sustaining outcomes achieved through other therapeutic approaches.

Similarly, Iguchi et al. (1996) demonstrated that reinforcement contingent on participation in problem-solving group therapy yielded better long-term abstinence rates than reinforcement contingent on negative urinalysis outcomes. These findings again suggest a more holistic attention to skill accumulation rather than symptomatic reduction, and also facilitate the integration of behavioural theories into broader, skills-oriented therapeutic paradigm.

4.2   Application Across Mental Health Diagnoses and Settings

Beyond substance use disorders, contingency-based interventions were shown to be effective across a range of mental health diagnoses, including schizophrenia, bipolar disorder, major depressive disorder, and emotional and behavioural disorders in children and adolescents. Winkler (1970) found that a contingency management program implemented within an inpatient psychiatric facility resulted in clinically important decreases in institutionalised behaviours and increases in prosocial behaviour.

In educational settings, Hawkins et al. (2015) employed an interdependent group contingency within an alternative school serving students with severe emotional and behavioural disorders. The intervention led to better classroom transitions, increased instructional time, and good acceptability for students and teachers. These results illustrate the potential that ABA-based group contingencies, when implemented in applied settings, can yield large system-level gains while also remaining socially valid and possible to implement.

4.3   Functional Analysis and Individualised Intervention

Another foundational contribution of ABA highlighted in this review is the use of functional analysis (FA) to identify the environmental functions of behaviour. Functional assessment ensures that interventions address the maintaining variables of behaviour rather than its surface form, increasing the likelihood of durable and generalised outcomes. For example, Allen (2013) presents a strong example of this strategy in the care of a woman suffering from schizoaffective disorder whose severe behaviours had proven to be difficult for the psychotherapist to manage. By identifying precursor behaviours and implementing noncontingent reinforcement (NCR) based on FA results, clinically significant reductions in maladaptive behaviour were achieved, resulting in improved quality of life.

More recent studies reported consistent findings (e.g., Ingvarsson et al., 2009; Kodak et al., 2003; Rasmussen & O'Neill, 2006; Rooker et al., 2018), thus confirming the efficacy of FA-informed interventions in mental health settings. NCR and associated procedures, in contrast, provide reinforcement outside the context of problem behaviour, which allows practitioners to develop functional communication and adaptive skills.

Functional communication training (FCT), a form of differential reinforcement of alternative behaviour (DRA), further demonstrated strong outcomes. Davis et al. (2018) reported near-elimination of severe aggressive behaviour alongside increases in task completion and functional responding in a child with multiple mental health diagnoses. These findings reinforce the applicability of ABA procedures for individuals with complex co-morbid presentations and significant behavioural challenges.

4.4   Implications and Limitations

Several important clinical implications emerge from the findings of this review. First, they illustrate the possibility and success of expanding ABA interventions and services to mental health as such patients exist beyond autism, thereby increasing access to behaviour-analytic knowledge. Objectively defining behaviour and identifying its function enables practitioners to teach replacement skills that meet the same needs, resulting in more sustainable and socially meaningful outcomes.

Second, the review highlights the importance of early identification of skill and performance deficits common to specific diagnostic groups. For example, deficits in problem-solving skills frequently identified among individuals with substance use disorders suggest opportunities for earlier, preventative intervention. Future research should be based on identifying these deficits to design targeted preventive treatment.

Despite these strengths, several limitations must be acknowledged. The reviewed studies included a wide range of ages, diagnoses, and settings, which enhances breadth but limits specificity. Future research would benefit from focusing on more narrowly defined populations to strengthen generalisability within subgroups. Additionally, long-term maintenance data were limited, with most studies reporting follow-up periods of one year or less. Extended follow-up is needed to better evaluate the durability of behavioural interventions over time.

Finally, although the effectiveness of ABA procedures in mental health contexts is evident, the field continues to face challenges related to practitioner competence and training. Many Board-Certified Behavior Analysts (BCBAs) receive limited preparation for working outside autism-focused settings. Addressing this gap will require enhanced training, supervision, and interdisciplinary collaboration to ensure ethical and competent practice across diverse populations.

Table 1 Summary of Methodological Procedure

Component	Description
Review Design	Systematic literature review conducted in acordance with PRISMA guidelines (Moher et al, 2009)
Primary Database	EBSCO
Publication Years	1970–2023
Language	English
Study Types Included	Experimental studies using single subject or mixed experimental designs
Population	Individuals with primary mental health diagnoses (e.g., depression, substance use disorders, schizophrenia, bipolar disorder).
Intervention Criteria	ABA-based interventions addressing mental health issues
Search Terms	"applied behavior analysis" OR "ABA" AND mental health; substance", use; depression NOT autism
Screening Process	Title and abstract screening followed by full-text review
Initial Records Identified	942
Duplicates Removed	74
Full-Text Articles Reviewed	145
Final Studies Included	27
Participant Age Categories	Youth (3–12), Adolescents (13–21), Adults (22–90)
Diagnostic Categories	Addictive disorders, schizophrenic disorders, depressive disorders, bipolar disorders, emotional/behavioral disorders
Settings	Inpatient facilities, day treatment programs, outpatient clinics, laboratory settings
Dependent Variables	Maladaptive behaviours reduced; adaptive behaviours increased
Independent Variables	Contingency management, reinforcement, behavioural activation, extinction
Outcome Measures	Graphical analysis, mastery criteria, author-reported outcomes
Generalisation & Maintenance	Reported duration, and context of generalisation/maintenance
Social Validity Assessment	Goals, procedures, and outcomes evaluated for social validity (Wolf, 1976)
Experimental Designs	Single-subject designs, predominantly reversal designs

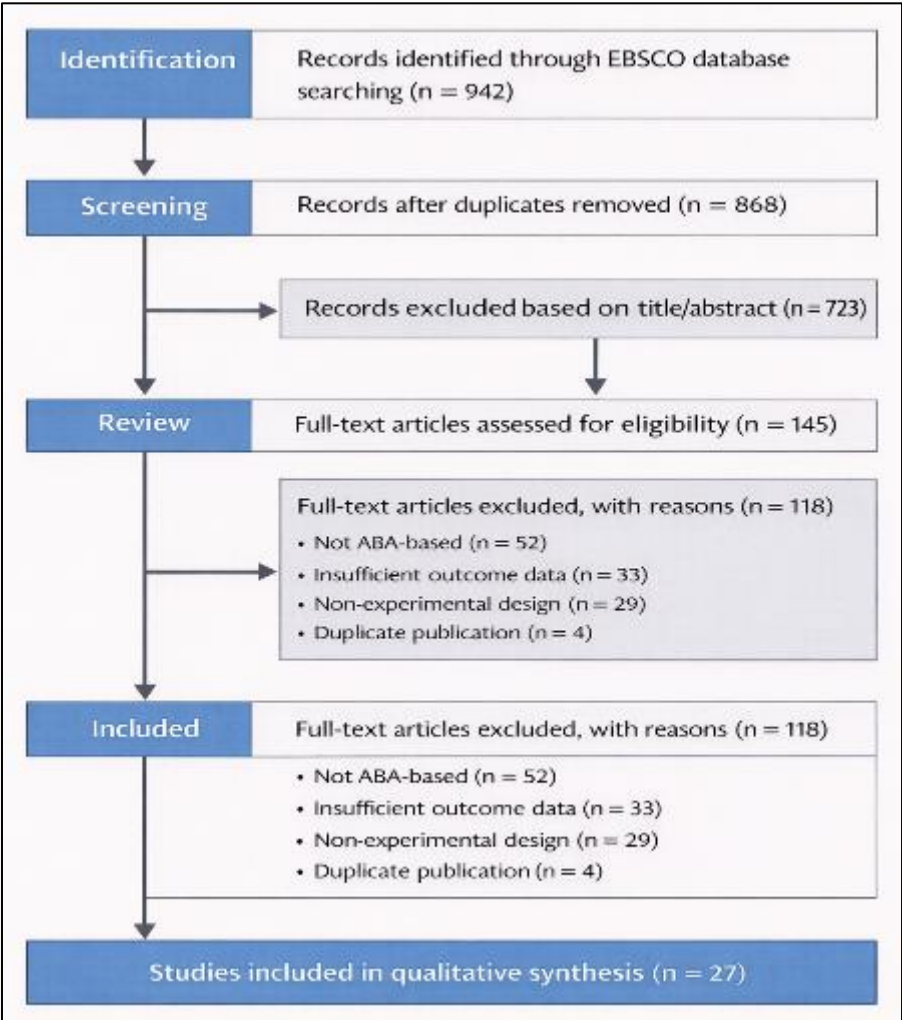**Table 2** PRISMA flow Diagram of Systemic Literature Review

Table 3 Overview of Results from systematic Literature Review

Category	Summary
Total Number of Studies	27 experimental studies were analyzed, published between 1970–2023.
Total Participants	A total of 564 participants were included: • Youth (Ages 3–12): 33% (186 participants) • Adolescents (Ages 13–21): 8% (45 participants) • Adults (Ages 22–90): 59% (333 participants)
Mental Health Diagnoses	Depressive Disorders: 15% of studies • Addictive Disorders: 22% of studies • Schizophrenic/Psychotic Disorders: 25% (5% of studies • Bipolar Disorders: 11% of studies • Emotional/Behavioral Disorders: 26% of studies
Settings	Inpatient facilities (30%), outpatient/day treatment clinics (51%), laboratory classroom settings (19%)
Types of ABA Interventions	Contingency management (37% of studies) • Reinforcement procedures (44% of studies) • Behavioral activation (15% of studies) • Extinction procedures, response cost at, and skills training (30% collectively) • Multi-component treatment packages (22%)
Primary Outcomes	Inpatient facilities (30%), outpatient/day treatment progn clinics (51%), laboratory/classroom settings (19%)
Types of ABA Interventions	Contingency management (37% of studies) • Reinforcement procedures (44% of studies) • Behavioral activation (15% of studies) • Extinction procedures, response cost, and skills training (30% collectively) • Multi-component treatment packages (22%)
Primary Outcomes	100% of studies demonstrated reduction in moladaptive symptoms (e.g., substance use, aggression, depression, delusional speech) 89% of studies showed increases in adaptive behaviors (e.g., sec., self-control, social skills, appropriate transitions, treatment adherence)
Generalization & Maintenance	63% of studies (17 studies) reported maintenance and generalization of treatment gains. with durations ranging from several weeks to 18 months.
Social Validity Assessment	Improvements generalised across settings or with new skills over half of the studies that assessed generalisation.

5   Conclusion

In conclusion, the results of this indicate that Applied Behavior Analysis has had a successful application to a range of other mental health-related behaviours, irrespective of autism, providing a firm empirical foundation for further applicability. However, the literature also focuses narrowly on behavioural reduction in controlled settings and under-explores trauma, participant voice, and long-term social validity. These gaps highlight the need for behavioural interventions that are not only effective, but also ethically sound and sensitive to the reality of lived experiences for individuals experiencing complex mental health challenges.

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