Proceeding of ICIHCS 2025 Symposium: Exploring Community Engagement: Identity, (In)equality, and Cultural Representation
DOI: 10.54254/2753-7064/2025.NE28291

The Efficacy of Culturally Adapted Plot-Based Improvisational Drama Therapy Intervention for Autistic Children: "The Peony Pavilion" Project's Effect on Chinese Autistic Children's Social-Emotional and Communication Skills

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Abstract. Autism Spectrum Disorder (ASD) presents challenges in social communication and interaction. While drama therapy (DT) shows promise as an intervention, there is a lack of empirically validated culturally adapted programs, particularly in China, and the inclusion of individuals with language impairments. This study proposes to evaluate the feasibility and preliminary efficacy of a 12-week plot-based improvisational drama therapy intervention for Chinese autistic children. Grounded in the classic Kunqu opera "The Peony Pavilion" and adapting principles from the Hunter Heartbeat Method, this intervention aims to improve social interaction, facial/emotion recognition, and language skills. A quasi-experimental pre-test/post-test design will compare 9 autistic children (1 female, 8 males, aged 10 to 15) participating in the DT intervention at a specialized school in Shanghai with 9 autistic children (1 female, 8 males, aged 12 to 14) participating in a Hulusi (gourd flute) music class as an active control group. Standardized measures and observational data assessed changes in social interaction, facial recognition, verbal/nonverbal language, and emotion sensitivity. Results show that the total CARS score reduction is significantly greater in the experimental group ($t(52) = -3.292$, $p = 0.002$), indicating that participants in the drama therapy group demonstrated significantly greater improvements compared to participants in the Hulusi control group. Specifically, the drama therapy group shows significant improvement in imitation, emotional response, and verbal/nonverbal communication skills. These findings provide preliminary evidence that this culturally adapted drama therapy intervention is an effective method for reducing core symptoms of autism in children.

Keywords: drama therapy, autism, cultural adaptation

1. Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition defined by core deficits in social communication/interaction and the presence of restricted, repetitive behaviors (RRBs)

DOI: 10.54254/2753-7064/2025.NE28291

[1]. These challenges often manifest as difficulties understanding social cues, engaging in reciprocal interactions, interpreting nonverbal communication like facial expressions, and building relationships [1, 2]. Many autistic individuals also experience difficulties with facial recognition, understanding and expressing emotions, and language skills [1, 3].

Drama therapy, the intentional use of dramatic and theatrical processes for therapeutic goals [4], offers a potentially valuable approach for addressing these core ASD challenges through its inherent focus on role-playing, embodiment, emotional expression, and social interaction within a safe, contained space [5, 6]. Plot-based improvisational methods, such as the Hunter Heartbeat Method using Shakespeare's The Tempest, have shown preliminary success in improving social skills and emotion recognition in autistic children in Western contexts [7].

However, significant gaps remain in the global application of drama therapy for Autism. There is a pressing need for culturally adapted interventions tailored to non-Western populations, particularly the lack of localized drama therapy curricula for Chinese autistic children. Furthermore, much of the existing research often relied on predominantly White, male participants with functional verbal skills, limiting the applicability of findings to autistic children with language impairments or from diverse cultural backgrounds [6, 8, 9]

To address these gaps, the present study develops and evaluates a culturally grounded drama therapy intervention for Chinese autistic children, including those with language challenges. Using Kunqu opera 'The Peony Pavilion' (牡丹亭) as the plot base for less verbally demanding games, this culturally adapted intervention can potentially improve ASD students' emotional and communication skills.

2. Literature review

2.1. Autism

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental condition defined by persistent deficits in social communication and the presence of repetitive and restrictive behaviors [1]. The global prevalence of ASD is estimated to affect approximately 1 in 100 children, which makes it a significant mental health concern [10]. With manifestations ranging from severe impairment to extraordinary abilities, the term “spectrum” captures the vast diversity in clinical presentation, etiological variables, and developmental trajectories [11, 2].

The DSM-5 states that Autism symptoms must be evident from an early age and result in clinically substantial impairment [1]. Atypical sensory processing is now acknowledged as a diagnostic characteristic that goes beyond social and communication challenges. This could include abnormal attention in sensory elements of the surroundings or hyper- or hypo-reactivity to sensory input. According to neurophysiological research, these variations stem from modified brain circuitry [12]. The therapeutic significance of this domain is highlighted by recent studies that emphasize sensory integration-based therapies as a crucial field of treatment research [13].

The etiology of ASD is multifactorial, involving a complex interplay of genetic and environmental factors. Research strongly indicates a substantial genetic basis, with hundreds of associated genes identified, though no single gene accounts for more than a small fraction of cases [14]. This genetic complexity contributes significantly to the disorder's heterogeneity. This heterogeneity is also evident in the observed sex and gender differences. ASD is diagnosed more frequently in men, but evidence indicates that diagnostic biases and camouflaging behaviors among women may also play a role in this discrepancy [15, 16].

DOI: 10.54254/2753-7064/2025.NE28291

Given the disorder's complexity, treatment approaches are necessarily individualized. A landmark meta-analysis of non-pharmacological interventions identified that behavioral approaches, particularly those grounded in developmental and naturalistic principles, have the most robust evidence base for improving social communication and developmental outcomes [17]. However, there is a growing recognition of the need for diverse, inclusive, and culturally relevant therapeutic options that can address the multifaceted needs of this population. Arts-based interventions, such as drama therapy, could provide accessible and engaging opportunities to promote social-emotional growth, especially for children with language or communication problems [18]. Ultimately, the aim of intervention is not to “cure” autism but to provide evidence-based, multidisciplinary support that promotes well-being, social participation, and quality of life.

2.2. Drama therapy

Drama therapy is a form of psychotherapy that utilizes theatrical processes to achieve therapeutic goals. Both the British Association of Drama Therapists (BADth) and the North American Drama Therapy Association (NADTA) emphasize their active, experiential nature, highlighting their ability to help individuals explore personal stories, solve problems, express emotions, and expand life roles through structured dramatic processes [4, 19] At its core, the practice is built on foundational principles such as "aesthetic distance," a concept articulated in Landy’s study [20], which posits that adopting a fictional role creates a protective buffer, allowing a client to safely explore real-life emotions and conflicts from a more manageable, metaphorical perspective [20]. This process allows for the rehearsal of new behaviors and the development of insight within a contained, creative space [5].

While the use of drama for community healing has ancient roots in ritual and theatre, drama therapy was formalized as a distinct clinical profession in the mid-20th century. Its development was significantly influenced by the work of pioneers like Jacob L. Moreno, the creator of psychodrama, who introduced concepts of role-playing and spontaneity into a therapeutic context [21]. The formalization of the discipline in the UK and US during the 1960s and 1970s also drew from the growth of humanistic psychology and innovations in experimental theatre [5]. This integration of principles from theatre, psychology, and anthropology established drama therapy as a structured therapeutic discipline with a unique theoretical base.

Contemporary drama therapy has diverse theories and models. Landy’s Role Method links psychological health to flexible role access, while Jennings’ Embodiment-Projection-Role (EPR) theory describes a developmental pathway from bodily experience to role play [20, 22]. Based on these frameworks, drama therapy is used in clinical and community settings to address conditions such as anxiety, depression, trauma, and schizophrenia [23, 24]. Its integration into fields like occupational therapy demonstrates its versatility, especially for autistic children [25]. Evidence from systematic reviews and meta-analyses shows significant positive effects on mental health outcomes [26, 27]. Key mechanisms include dramatic projection, embodiment, emotional catharsis, and the development of social connection [28].

2.3. Drama therapy’s application in autism care

Systematic reviews of the existing literature indicate that drama-based interventions are a well-suited and promising approach for autistic youth. The active and embodied format of these interventions is particularly relevant because attention challenges are a common co-occurring feature of ASD [29]. Unlike traditional talk-based therapies that require sustained, passive focus, the

DOI: 10.54254/2753-7064/2025.NE28291

interactive nature of drama therapy can more effectively engage participants, thereby creating a more accessible therapeutic environment. The evidence synthesized in these reviews suggests that theater-based interventions can address the core deficits of ASD. Prior study concluded that these programs show a positive effect on social communication and underlying social-cognitive skills [6]. Specifically, the review found evidence for improvements in observable behaviors like reciprocal interaction and peer relationships, as well as in foundational abilities such as Theory of Mind and emotion recognition. These empirical findings are supported by theoretical analyses, which propose that core drama therapy techniques like improvisation and role-play function as the mechanisms that directly target these specific social deficits [25].

Despite these promising findings, the same reviews also identify critical limitations within the current evidence base. The conclusions of any review are fundamentally dependent on the quality and scope of the primary studies it includes. In this case, McDonald and his colleagues report that the existing research is predominantly based on small, homogenous samples, which consist mainly of verbal, white adolescent males [6]. This lack of demographic diversity severely restricts the generalizability of the results. It remains unclear whether these interventions are equally effective for autistic females, non-verbal individuals, younger children, or participants from different cultural backgrounds.

Research distinguishes between performance-oriented and process-oriented drama therapy for autistic individuals, each balancing structure, creativity, and accessibility differently. Performance-oriented methods involve script-based productions or theatre camps, where participants rehearse and stage a final performance. This structured process fosters group cohesion, communication practice, and self-efficacy [30, 31]. However, its demands limit accessibility, often excluding non-verbal individuals or those with language impairments [32], and the performance focus may heighten anxiety [33] while reducing therapeutic flexibility. Process-oriented models, on the other hand, prioritize the therapeutic experience over the final output. While sensory-integrated dramatic play, like Imagining Autism, uses immersive environments to support non-verbal communication and joint attention, improvisation and role-play create "micro-social situations" for practicing new behaviors in safe, fictional contexts [34, 35]. Despite being more inclusive, these approaches might be erratic, lack thematic consistency, and make people who need structure anxious [36].

To bridge these gaps, hybrid models like script-based improvisational drama combine narrative structure with flexibility. The Hunter Heartbeat Method, using Shakespeare’s The Tempest, exemplifies this approach. To create safety and unity, sessions start with the rhythmic "heartbeat circle." After that, improvisational games like mirroring and emotion play are used to explore social and emotional themes [22, 37]. While improvisation encourages originality and spontaneity, the script offers a consistent structure and a wide range of emotive terms. Crucially, participants can indirectly interact with challenging emotions through the employment of fictitious characters, which provides aesthetic distance [7]. Cultural relevance is still crucial despite these benefits. While meta-analyses indicate that culturally adapted interventions are more effective than unadapted ones, the majority of current programs rely on Western texts, which limits accessibility [38].

The present study aims to examine the effects of a culturally adapted classroom-based intervention for Chinese Autism children. The selection of "The Peony Pavilion" as the plot base is hypothesized to increase engagement by allowing participants to connect with familiar characters and shared values. The primary hypothesis is that the drama therapy group would demonstrate significantly greater improvements in CARS scores compared to the active control group. This research aims to address a notable gap by developing a culturally relevant therapeutic option for

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autistic children in China. A secondary aim is to investigate the intervention's impact on children with language impairment, a subgroup that is often overlooked in drama therapy research.

3. Methodology

3.1. Study design

To evaluate the intervention, this study employed a quasi-experimental design with an active control group, utilizing pre-test, mid-test, and post-test measurements. The research was designed to assess the feasibility and preliminary efficacy of a 12-week, plot-based improvisational drama therapy (DT) intervention for autistic children in Shanghai, China.

The intervention group (N=9) participated in the drama therapy (DT) program, which was grounded in the classic Kunqu opera “The Peony Pavilion” and adapted principles from the Hunter Heartbeat Method. The active control group (N=9) participated in a Hulusi (gourd flute) music class for the same duration. A quasi-experimental approach was chosen due to the practical and ethical constraints of random assignment within the specialized school setting.

Data were collected at three time points: before the intervention began (pre-test), at the 6-week midpoint (mid-test), and upon completion of the 12-week program (post-test). To mitigate potential bias, behavioral observations were conducted by three independent raters for each child: the group facilitator and two classroom teachers who were familiar with the children but not directly involved in the intervention delivery.

The primary outcome was measured using the Childhood Autism Rating Scale (CARS) [39]. The Chinese version of the CARS was selected as it has demonstrated strong reliability and validity within the local context [40].

3.2. Participants

Nineteen children with clinically diagnosed ASD were recruited from a specialized school in Shanghai. Children were assigned to groups based on existing class schedules. The DT group initially had 10 participants, and the control group had 9. One DT participant (female, age 11) withdrew due to absenteeism and emotional distress, leaving a final sample of 18 (DT = 9, control = 9). The DT group included 8 males and 1 female (M age = 12.56, SD = 1.81, range = 10–15). The control group also included 8 males and 1 female (M age = 12.89, SD = 0.78, range = 12–14). There were no baseline differences in age or gender. No exclusions were applied for language or cognitive functioning.

3.3. Measurement

The primary outcome measure was the Childhood Autism Rating Scale, a widely recognized clinician-rated instrument for assessing autism severity [8]. The CARS was chosen for two reasons: firstly, it is one of the most established observational tools for autism, with demonstrated reliability and validity across diverse settings; secondly, its availability and validation in a Chinese context made it suitable for this study, as all three raters were native Mandarin speakers familiar with the local cultural and educational environment [40]. In the Chinese validation study, the scale showed acceptable internal consistency and strong convergent validity with other autism assessments [40].

DOI: 10.54254/2753-7064/2025.NE28291

The CARS consists of 15 items that capture behaviors across four domains: social communication and interaction (Relating to People, Imitation, Rmotional Response, Verbal Communication and Nonverbal Communication), restricted and repetitive behaviors (Body Use, Object Use, Adaptation to Change), sensory processing (Visual Response, Listening Response, Saste, Smell, and Touch Response), and general functioning and emotional regulation (Fear or Nervousness, Activity Level, Level and Consistency of Intellectual Response, and General Impression). Each item is scored on a four-point scale from 1 (within normal limits for age) to 4 (severely abnormal), producing a total score between 15 and 60. Higher scores indicate more severe symptoms, with clinical cutoffs distinguishing non-autistic (<30), mild to moderate autism (30–36), and severe autism (≥36).

In the present study, the CARS was administered at three-time points: pre-test (before the first session), mid-test (after the fifth session), and post-test (after the tenth and final session). At each time point, three independent raters—the group facilitator and two classroom teachers—completed the ratings. All raters were trained in CARS scoring procedures before data collection. For each participant, the final score at each time point was calculated as the mean of the three raters' ratings.

3.4. Intervention procedure

The drama therapy (DT) intervention consisted of 10 weekly sessions, each lasting 60-minute, delivered over 12 weeks, with planned breaks during the fifth and tenth weeks for rest and integration. The program was led by a trained facilitator and supported by two teaching assistants. Additionally, one of the participants' regular classroom teachers was present during each session as a non-participating observer. Each 60-minute session included a 5 to 10-minute break at the midpoint to allow for rest and regulation. The intervention followed a hybrid model that combined the structure and principles of the Hunter Heartbeat Method [37] with the narrative framework of the classic Kunqu opera The Peony Pavilion. This integration was intended to improve participants' emotional perception, expression, and social interaction by embedding therapeutic exercises within a culturally familiar story.

Each session incorporated several core therapeutic components. A key ritual was the Heartbeat Circle, used to open and close every session. This practice, adapted from the Hunter Heartbeat Method, involved participants creating a shared, steady rhythm. Through patting their thighs, which served to establish a safe, predictable environment and introduce the session's emotional themes (e.g., excitement, sadness). The facilitator also used a drum as a consistent auditory cue to signal transitions and gain the group's attention, providing clear structure. The intervention heavily utilized sensory engagement and principles of embodiment [22]. Props used in the sessions included scarves, petals, bells, and costumes (e.g. hats, traditional water sleeves, and headdresses,) which made students immense in the scenario. Abstract ideas (e.g., a soul, illness, a vow) are often represented by physical propositions to make sure that they become tangible and accessible for the participants.

The 10-session curriculum was structured in three distinct stages, progressing from simple imitation to more complex interaction. Stage 1: Foundations and Character Introduction (Sessions 1-2): The initial sessions focused on establishing safety, group cohesion, and introducing the main characters and initial plot points. Activities were centered on non-verbal imitation and basic emotional expression. For example, participants engaged in mirror games ("影子镜像") to embody the physicalities of the main characters and passed simple facial expressions ("春香传信") to practice foundational emotion recognition. Stage 2: Narrative Deepening and Skill Practice (Sessions 3-9): The middle phase of the intervention guided participants through the core narrative of "The Peony Pavilion," exploring more complex themes such as loss, reunion, and conflict. The

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activities required increased peer interaction and emotional range. For instance, participants used scarves to represent the abstract concept of a soul ("魂魄与画像"), worked in pairs to enact a vow ("红绳结誓"), and explored conflict and resolution through structured role-play ("生气与和好"). Stage 3: Integration and Consolidation (Session 10): The final session was dedicated to reviewing and consolidating the narrative and the skills learned throughout the program. Activities like the "plot train" ("情节火车") allowed participants to recap the entire story through a sequence of learned gestures, reinforcing their understanding of the emotional and social journey of the characters.

The active control group participated in a Hulusi (gourd flute) music class for the same duration and frequency. This was an existing course offered by the school, led by one main instructor and supported by two classroom teachers who assisted with classroom management. This activity was chosen to control for factors such as structured group participation, attention from an instructor, and the process of learning a new artistic skill, thereby isolating the specific effects of the drama therapy content.

3.5. Analysis

All statistical analyses were conducted using SPSS (Version 28.0). Before the main analysis, the raw scores from the three raters for each participant were averaged to create a single composite score for each of the 15 CARS items at each time point (pre-test, mid-test, and post-test). A total CARS score was then calculated for each participant at each time point by summing these 15 item scores. Descriptive statistics (means and standard deviations) were computed for total scores in both the intervention and control groups at all three-time points.

The main analyses proceeded in three steps. First, baseline equivalence between groups was examined using an independent-samples t-test on pre-test total CARS scores. Second, group differences in outcomes were assessed with a t-test comparing post-test total scores. Third, to evaluate the primary hypothesis regarding change over time, gain scores were calculated for each participant (post-test minus pre-test), and an independent-samples t-test was used to compare gain scores between the drama therapy and control groups.

Secondary analyses explored changes at the domain level. Independent-samples t-tests were conducted on the gain scores for each of the 15 individual CARS items to identify specific areas of improvement. Additionally, exploratory analyses examined potential gender differences in total scores at each time point and in gain scores. These results were interpreted with caution given the small number of female participants. For all analyses, statistical significance was set at $p < .05$.

4. Results

The primary outcome variable was the total score on the Childhood Autism Rating Scale (CARS), calculated by summing the scores of all 15 items. Data were collected at three-time points: pre-test, mid-test, and post-test. The total sample consisted of 18 participants, with each participant being assessed by three independent raters.

Table 1 presents the overall descriptive statistics for the total CARS scores, combining both the intervention and control groups. At the pre-test, the overall mean score was 34.91 (SD = 10.40). This score decreased to a mean of 33.63 (SD = 9.77) at the mid-test, and further decreased to 32.04 (SD = 9.08) at the post-test. This pattern reflects a gradual and consistent reduction of autism symptom severity across the 12 weeks.

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Table 1. Overall score (sum of all 15 questions) for pre-, mid-, post-test

Descriptive analysis			
	TEST(mean ± standard deviation)		
	PRE(n=54)	MID(n=54)	POST(n=54)
OVERALL	34.907±10.400	33.630±9.772	32.037±9.080

4.1. Baseline comparison

Table 2. T-test on control group pre-test score vs. treatment group pre-test score

T-test analysis results				
	GROUP(mean ± standard deviation)		t(df)	p
	EXPERIMENTAL(n=27)	CONTROL(n=27)		
OVERALL	33.481±10.124	36.333±10.666	-1.008(52)	0.318

* p<0.05 ** p<0.01 *** p<0.001

To evaluate the intervention's effect, a series of independent-samples t-tests was conducted to compare the total CARS scores between the drama therapy (experimental) group and the Hulusi (control) group at each of the three time points.

An independent-samples t-test was conducted on the pre-test scores to ensure baseline equivalence between the two groups. The results showed that the mean CARS score of the experimental group was 33.48 (SD=10.12), while that of the control group was 36.33 (SD = 10.67), t(52) = -1.01, p = .318. These results indicate that, at baseline, the two groups did not differ significantly in autism symptom severity (p > 0.05), confirming their comparability before intervention. The two groups were comparable in their level of autism symptom severity before the intervention began.

4.2. Comparison of the total scores

Table 3. T-test on control group mid-test score vs. treatment group mid-test score

T-test analysis results				
	GROUP(mean ± standard deviation)		t(df)	p
	EXPERIMENTAL(n=27)	CONTROL(n=27)		
OVERALL	32.185±9.224	35.074±10.258	-1.088(52)	0.282

* p<0.05 ** p<0.01 *** p<0.001

Likewise, the overall CARS scores of the experimental group and the control group in the intermediate test were also tested by t-test. The mean was 32.19 (SD = 9.22) for the experimental group and 35.07 (SD = 10.26) for the control group, with t(52) = -1.09, p = .282. Consistent with the pre-test findings, the mid-test analysis showed no significant group differences (p > 0.05), suggesting that symptom trajectories remained comparable up to this stage.

DOI: 10.54254/2753-7064/2025.NE28291

Table 4. T-test on control group post-test score vs. treatment group post-test score

T-test analysis results				
	GROUP(mean ± standard deviation)		t(df)	p
	EXPERIMENTAL(n=27)	CONTROL(n=27)		
OVERALL	29.370±8.422	34.704±9.076	-2.238(52)	0.030 *

* p<0.05 ** p<0.01 *** p<0.001

Finally, an independent-samples t-test was conducted on the scores of the experimental group and the control group at post-test to assess the primary outcome of the intervention. The mean CARS total score was 29.37 ± 8.42 for the experimental group and 34.70 ± 9.08 for the control group, with a t(52) = -2.24, p = .030, achieving statistical significance (p < 0.05). This indicates that after the 12 weeks, the children in the drama therapy group demonstrated a significantly lower level of autism symptom severity compared to the children in the active control group.

4.3. Comparison of pre-post total score change

Table 5. T-test on control group total score change (post-test-pre-test) vs. treatment group total score change (post-test-pre-test)

T-test analysis results				
	GROUP(mean ± standard deviation)		t(df)	p
	EXPERIMENTAL(n=27)	CONTROL(n=27)		
OVERALL	-4.111±3.117	-1.630±2.372	-3.292(52)	0.002**

* p<0.05 ** p<0.01 *** p<0.001

To directly test the primary hypothesis and compare the magnitude of change between the two groups, an independent-samples t-test was performed on the change scores. Change scores were calculated for each participant by subtracting their pre-test total CARS score from their post-test total CARS score, where a negative value represents an improvement (i.e., a reduction in symptoms).

According to the analysis results in the table, the change scores of the experimental group and the control group were -4.111 ± 3.117 and -1.630 ± 2.372, respectively. The results of the t-test showed t(52) = -3.29, p = .002, indicating a significant difference in change scores between the experimental group and the control group (p < 0.01). The children in the drama therapy group experienced a significantly greater reduction in their CARS scores over the 12 weeks compared to the children in the active control group.

4.4. Comparison of each individual question

Table 6. T-test on control group pre-test individual scores vs. treatment group pre-test individual scores

T-test analysis results				
	GROUP(mean ± standard deviation)		t(df)	p
	EXPERIMENTAL(n=27)	CONTROL(n=27)		

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Table 6. (continued)

Q1. Relating to People	2.444±1.188	2.333±1.177	0.345(52)	0.731
Q2. Imitation	2.185±0.879	2.333±1.074	-0.555(52)	0.581
Q3. Emotional Response	2.185±1.178	2.444±0.974	-0.881(52)	0.382
Q4. Body Use	1.852±0.818	2.593±1.010	-2.961(52)	0.005**
Q5. Object Use	2.333±1.177	2.111±1.013	0.744(52)	0.460
Q6. Adaptation to Change	2.667±1.074	2.444±0.847	0.844(52)	0.403
Q7. Visual Response	2.370±0.839	2.593±0.747	-1.028(52)	0.309
Q8. Listening Response	1.889±0.577	2.630±0.839	-3.780(52)	0.000***
Q9. Taste, Smell, and Touch Response	1.667±0.961	2.111±0.751	-1.894(52)	0.064
Q10. Fear or Nervousness	2.111±0.892	2.333±1.074	-0.827(52)	0.412
Q11. Verbal Communication	1.963±0.980	2.444±0.847	-1.931(52)	0.059
Q12. Non-verbal Communication	2.222±0.934	2.481±0.893	-1.043(52)	0.302
Q13. Activity Level	2.667±0.832	2.407±0.797	1.169(52)	0.248
Q14. Level and Consistency of Intellectual Response	2.037±0.706	2.333±0.679	-1.571(52)	0.122
Q15. General Impression	2.889±0.751	2.741±0.813	0.696(52)	0.490

* p<0.05 ** p<0.01 *** p<0.001

To examine baseline equivalence at each question, independent-samples t-tests were conducted on the pre-test scores for each of the 15 CARS items. The comparison of pretest scores between the control group and the experimental group showed significant differences in only a few questions such as Body Use (Q4) and Listening Response (Q8). For Q4, the mean for the control group was 2.59 with SD =1.01, while the mean for the experimental group it was 1.85 with SD = 0.82. $t(52) = -2.96$, $p = .005$ indicates a significant difference in scores between the two groups on this question ($p < 0.01$). Likewise, there was a significant difference in Q8, with $t(52) = -3.78$, $p < .001$.

However, most of the questions (such as Q1, Q2, Q5, etc.) did not show significant differences in the pretest stage. This indicates that at baseline, the experimental group and the control group performed similarly across most of the specific symptom domains measured by the CARS.

Table 7. T-test on control group mid-test individual scores vs. treatment group mid-test individual scores

T-test analysis results				
	GROUP(mean ± standard deviation)		t(df)	p
	EXPERIMENTAL(n=27)	CONTROL(n=27)		
Q1. Relating to People	2.111±0.934	2.259±1.095	-0.535(52)	0.595
Q2. Imitation	1.704±0.724	2.407±1.152	-2.687(52)	0.010 *
Q3. Emotional Response	2.037±1.055	2.519±1.051	-1.679(52)	0.099
Q4. Body Use	1.815±0.834	2.074±0.829	-1.146(52)	0.257
Q5. Object Use	2.444±1.188	2.111±1.013	1.110(52)	0.272
Q6. Adaptation to Change	2.556±1.013	2.444±0.847	0.437(52)	0.664
Q7. Visual Response	2.407±0.844	2.593±0.747	-0.854(52)	0.397
Q8. Listening Response	2.000±0.480	2.111±0.801	-0.618(52)	0.540
Q9. Taste, Smell, and Touch Response	1.778±0.934	2.111±0.751	-1.445(52)	0.154
Q10. Fear or Nervousness	2.222±0.934	2.333±1.074	-0.406(52)	0.687
Q11. Verbal Communication	1.815±0.921	2.444±0.847	-2.614(52)	0.012 *

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Table 7. (continued)

Q12. Non-verbal Communication	1.852±0.818	2.481±0.893	-2.701(52)	0.009**
Q13. Activity Level	2.556±0.847	2.111±0.698	2.104(52)	0.040 *
Q14. Level and Consistency of Intellectual Response	2.000±0.679	2.333±0.679	-1.803(52)	0.077
Q15. General Impression	2.889±0.751	2.741±0.764	0.718(52)	0.476

* p<0.05 ** p<0.01 *** p<0.001

During the intermediate test phase, questions such as Imitation (Q2), Verbal Communication (Q11), Nonverbal Communication (Q12), and Activity Level (Q13) showed significant differences. Specifically, the experimental group scored significantly lower than the control group on Imitation (Q2), t(52) = -2.69, p = .010; Verbal Communication (Q11), t(52) = -2.61, p = .012; and Nonverbal Communication (Q12), t(52) = -2.70, p = .009, indicating that the experimental group and the control group had more obvious differences in performance on these questions. In contrast, most other items did not show significant differences, indicating that the intervention effects were emerging selectively rather than broadly at the mid-test stage.

Table 8. T-test on control group post-test individual scores vs. treatment group post-test individual scores

T-test analysis results				
	GROUP(mean ± standard deviation)		t(df)	p
	EXPERIMENTAL(n=27)	CONTROL(n=27)		
Q1. Relating to People	1.815±0.681	2.185±1.075	-1.512(52)	0.138
Q2. Imitation	1.556±0.506	2.444±1.188	-3.578(52)	0.001**
Q3. Emotional Response	1.704±0.869	2.556±1.086	-3.182(52)	0.002**
Q4. Body Use	1.741±0.764	2.037±0.518	-1.668(52)	0.102
Q5. Object Use	2.222±1.086	2.185±0.622	0.154(52)	0.879
Q6. Adaptation to Change	2.111±0.801	2.407±0.844	-1.323(52)	0.191
Q7. Visual Response	2.259±0.813	2.481±0.700	-1.076(52)	0.287
Q8. Listening Response	2.000±0.480	1.926±0.550	0.527(52)	0.600
Q9. Taste, Smell, and Touch Response	1.741±0.859	2.222±0.577	-2.417(52)	0.019 *
Q10. Fear or Nervousness	2.074±0.958	2.370±0.967	-1.131(52)	0.263
Q11. Verbal Communication	1.593±0.694	2.370±0.792	-3.839(52)	0.000***
Q12. Non-verbal Communication	1.593±0.694	2.370±0.926	-3.493(52)	0.001***
Q13. Activity Level	2.481±0.849	2.185±0.622	1.462(52)	0.150
Q14. Level and Consistency of Intellectual Response	2.074±0.550	2.333±0.679	-1.542(52)	0.129
Q15. General Impression	2.407±0.747	2.630±0.688	-1.137(52)	0.261

* p<0.05 ** p<0.01 *** p<0.001

By the end of the intervention, the experimental group scored significantly lower than the control group on several key items. These included Imitation, t(52) = -3.58, p = .001; Emotional Response, t(52) = -3.18, p = .002; Taste, Smell, and Touch Response, t(52) = -2.42, p= .019; Verbal Communication, t(52) = -3.84, p < .001; and Nonverbal Communication, t(52) = -3.49, p = .001. These results indicate that by the end of the study, the drama therapy intervention had led to significant improvements in specific domains of social communication, emotional response, and sensory processing compared to the active control group.

DOI: 10.54254/2753-7064/2025.NE28291

Table 9. T-test on control group individual score changes (post-test-pre-test) vs. treatment group individual score changes (post-test-pre-test)

T-test analysis results				
	GROUP(mean ± standard deviation)		t(df)	p
	EXPERIMENTAL(n=27)	CONTROL(n=27)		
Q1. Relating to People	-0.630±0.629	-0.148±0.362	-3.446(52)	0.001**
Q2. Imitation	-0.630±0.492	0.111±0.320	-6.556(52)	0.000***
Q3. Emotional Response	-0.481±0.509	0.111±0.320	-5.119(52)	0.000***
Q4. Body Use	-0.111±0.424	-0.556±0.698	2.828(52)	0.007**
Q5. Object Use	-0.111±0.506	0.074±0.675	-1.140(52)	0.259
Q6. Adaptation to Change	-0.556±0.506	-0.037±0.192	-4.974(52)	0.000***
Q7. Visual Response	-0.111±0.506	-0.111±0.320	0.000(52)	1.000
Q8. Listening Response	0.111±0.320	-0.704±0.465	7.495(52)	0.000***
Q9. Taste, Smell, and Touch Response	0.074±0.385	0.111±0.424	-0.336(52)	0.738
Q10. Fear or Nervousness	-0.037±0.518	0.037±0.437	-0.568(52)	0.572
Q11. Verbal Communication	-0.370±0.492	-0.074±0.267	-2.750(52)	0.009**
Q12. Non-verbal Communication	-0.630±0.492	-0.111±0.320	-4.589(52)	0.000***
Q13. Activity Level	-0.185±0.396	-0.222±0.577	0.275(52)	0.784
Q14. Level and Consistency of Intellectual Response	0.037±0.437	0.000±0.000	0.440(52)	0.663
Q15. General Impression	-0.481±0.509	-0.111±0.424	-2.905(52)	0.005**

* $p<0.05$ ** $p<0.01$ *** $p<0.001$

As shown in Table 9, significant differences favoring the experimental group were found across several key domains, including Imitation (Q2), Emotional Response (Q3), Taste, Smell, and Touch Response (Q9), Verbal Communication (Q11), and Nonverbal Communication (Q12). For the Imitation item (Q2,) the score variation in the experimental group was -0.630 ± 0.492, and in the control group it was 0.111 ± 0.320. The t-test results show $t(52) = -6.56$, $p < .001$., reaching a very significant level ($p < 0.001$). Likewise, the Emotional Response item (Q3) showed a significant difference $t(52) = -5.12$, $p < .001$.

In particular, for Listening Response (Q8), the change score for the experimental group was 0.111 ± 0.320, and for the control group it was -0.704 ± 0.465, $t(52) = 7.46$, $p < .001$. This indicates a significant difference in the score change between the experimental group and the control group for this question. This may suggest that there was a significant decrease in auditory deficiency in the Hulusi control group, while not in the drama therapy experimental group.

In contrast, items like Object Use (O5) and Visual Response (Q7) did not show significant differences in score changes, suggesting that score changes in these questions were less affected by

DOI: 10.54254/2753-7064/2025.NE28291

the experimental intervention. These results indicate that by the end of the study, the drama therapy intervention had led to significant improvements in specific domains of social communication, emotional response, and sensory processing compared to the active control group.

5. Discussion

This study evaluated a culturally adapted drama therapy intervention for children with autism. The primary finding was that the drama therapy group showed a significant reduction in total CARS scores compared to an active control group that participated in Hulusi music classes. Analysis of change scores further supported this conclusion, with the drama therapy group demonstrating significantly greater symptom reduction than the control group ($p = .002$) These findings support the initial hypothesis that the intervention is an effective method for reducing core symptoms of autism.

5.1. Interpretation of findings

The improvements observed in the experimental group appear to be directly linked to distinct components embedded in the intervention design. The drama therapy program led to significant improvements on items related to social interaction and communication, including Imitation (Q2), Emotional Response (Q3), Verbal Communication (Q11), and Nonverbal Communication (Q12). These improvements can be understood through the core therapeutic principles of drama therapy. According to role theory, individuals possess a repertoire of roles that they use in life; for individuals with autism, this repertoire may be limited. By taking on the roles of characters from "The Peony Pavilion," participants could safely explore, rehearse, and expand their repertoire of social and emotional behaviors in a structured context [20]. Furthermore, the intervention's emphasis on physical action over verbal instruction aligns with the principle of embodiment, which posits that emotional and cognitive understanding is achieved through bodily experience [41]. This physical approach provides a direct, non-verbal pathway for learning that can bypass challenges with abstract language. This aligns with systematic reviews of the field, which identify the enhancement of social-emotional skills as a primary outcome of drama therapy interventions [27].

The structured nature of the intervention appears to have played a particularly important role. The significant improvement on Adaptation to Change (Q6) suggests that the predictable rituals created a secure environment. This finding is consistent with established evidence-based practices for autism, which emphasize the use of structured environments to support learning [42]. The emphasis on structure and predictability is also a core component of the Hunter Heartbeat Method for autism. In their evaluation of that method, Mehling et al. argue that its effectiveness stems from the use of Shakespeare's rhythmic iambic pentameter in Heartbeat circles and repetitive, sensory-based games [7]. This structure provides a calming and organizing sensory input that helps regulate the participants [7]. In our study, the “Heartbeat Circle” was adapted from Hunter’s method, and the consistent, structured drama games likely provided a rhythmic, predictable, and safe state necessary for therapeutic engagement. This aligns with foundational dramatherapy theory on how the structured, symbolic nature of ritual creates a safe container necessary for psychological transformation [41].

Finally, the use of the classic Chinese opera "The Peony Pavilion" was a central therapeutic element. Research shows that culturally adapted mental health interventions are more effective than non-adapted ones [38]. Using a familiar cultural narrative likely increased participant engagement and made abstract emotional concepts within the story more accessible and meaningful.

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The data also reveal a more nuanced picture of how the intervention worked. The effects appear to have been cumulative. At the mid-test point, the difference in total CARS scores between the groups was not yet statistically significant. However, item-level analysis showed that significant improvements had already begun to emerge in core areas like Imitation (Q2) and Verbal Communication (Q11). This suggests that the initial sessions successfully established a foundation of safety and group cohesion, which then enabled more direct therapeutic work in the later sessions.

The results for Body Use (Q4) and Auditory Response (Q8) also require specific discussion. The two groups were not equivalent at baseline on these items, which is a limitation. Furthermore, the analysis of change scores showed that the control group improved significantly more on these two items. A likely explanation is the nature of the control activity. Playing the Hulusi flute directly requires fine motor control (Body Use, Q4) and careful listening to pitch and tone (Listening Response, Q8). This explanation is supported by research on music therapy, which shows that instrumental practice can specifically improve sensorimotor and auditory processing skills in individuals with ASD [43]. Therefore, the improvement in the control group on these specific items may reflect the targeted effects of their music class, rather than a failure of the drama therapy intervention.

5.2. Strengths, limitations, and future directions

This study has several strengths, including the use of an active control group, a standardized assessment tool (CARS), an innovative culturally adapted design, and three independent raters. At the same time, several limitations must be acknowledged. Firstly, the small sample size limits the generalizability of the findings. Moreover, the quasi-experimental design did not use random assignment. As noted, the groups also differed at baseline on two CARS items. Furthermore, while all 18 participants had a formal clinical diagnosis of autism, their teachers' ratings on the CARS reflected lower severity than their actual diagnosis. Reported several scores lower than 30, which suggests that these children don't have autism. This may be attributable to a rater contrast effect: within a specialized school where all students have different levels of autism, teachers might perceive children with milder symptoms as being closer to normal. Importantly, this bias is unlikely to have compromised the study's primary findings since the baseline total CARS scores did not differ significantly between the experimental and control groups. Finally, the absence of long-term follow-up limits conclusions about the durability of the intervention's effects.

Future research should aim to replicate these findings with a larger sample using a randomized controlled trial (RCT) design. Future studies should also include long-term follow-up assessments. Lastly, incorporating qualitative methods could provide deeper insight into the mechanisms of change.

6. Conclusion

This study provides preliminary evidence that a culturally adapted drama therapy intervention can be effective in reducing the core symptoms of autism in children. The findings suggest that combining established therapeutic principles, such as role theory and embodiment, with culturally relevant content is a promising approach for autism intervention. This research contributes a new, culturally grounded model to the field and highlights the potential of using traditional art forms to meet contemporary therapeutic needs.

DOI: 10.54254/2753-7064/2025.NE28291

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