ORIGINAL ARTICLE

WILEY

The development of the Cognitive Behavioural Social Competence Therapeutic Intervention for Adults with Autism: A mixed methods report

David Tate[1] 🔵 | Linda Dubrow-Marshall[1] 🔵 | Clare S. Allely[1,2]

[1]School of Health and Society, University of Salford, Manchester, UK

[2]Gillberg Neuropsychiatry Centre, University of Gothenburg, Gothenburg, Sweden

Correspondence
David Tate, School of Health and Society, University of Salford, Manchester, UK.
Email: d.tate2@salford.ac.uk

Abstract

Background: Many young people with autism can have an average or above average IQ, yet they still struggle with the social competencies needed to successfully navigate into adulthood. Despite many individuals with autism experiencing significant challenges during their transition into adulthood, evidence-based therapeutic interventions to support individuals with autism during this transition are limited. The current literature suggests that cognitive behavioural therapy interventions can help improve social skills and the mental health of individuals with autism. However, little is known about the benefits for young adults with autism transitioning or who have transitioned into adulthood.

Aims and Method: The aim of this research was to deliver a newly developed Cognitive Behavioural Social Competence Therapeutic Intervention for Adults with Autism (CBSCTI-A) to five young adults with autism. Research aims were to evaluate intervention feasibility and efficacy by triangulating data findings using a mixed methods approach.

Results: Results support feasibility, with CBSCTI-A receiving very high user satisfaction ratings, and adherence to the intervention was high, recorded at ~90%. Fidelity to treatment was also high, ranging from ~86% to ~100%. Quantitative findings indicate that over an eight-week time period, a small sample of young adults with autism experienced significant improvements with regard to their social motivation, non-verbal conversation, emotional empathy, assertiveness, interpersonal relationships and self-control. Qualitative findings provide further anecdotal support for intervention feasibility and efficacy. After the completion of the intervention, participants and their parents were invited to complete semistructured interviews. Thematic analysis (TA) revealed four main themes: user satisfaction, important components of therapeutic intervention, challenges and critiques, and recommendations.

Conclusions: CBSCTI-A appears to be a feasible intervention; however, future research with larger samples and more rigorous controlled trials is needed before efficacy can be established.

1 | INTRODUCTION

As classified in The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5-TR; American Psychiatric Association, 2022), autism is characterised by difficulties in social communication and social interaction and restrictive repetitive behaviours. Autism is a complex and pervasive condition that affects approximately 1 in 36 children in the United States, and it is estimated to be 3.8 times more common in males than in females (Maenner et al., 2021). The Centers for Disease Control and Prevention prevalence data for autism in adults do not exist; however, in the UK, the estimated prevalence of adults with autism is approximately 1 in 100 (Brugha et al., 2016).

Social difficulties can be persistent and pervasive throughout life for many individuals with autism and are arguably the most defining challenge to overcome during adulthood (Tobin et al., 2014). There is currently no treatment to cure autism, and maturation alone does not always improve social development (Hendricks & Wehman, 2009; Shattuck et al., 2007; Woodman et al., 2015). Social difficulties can impact important aspects of daily life, and transitioning into adulthood can be a specifically challenging time (Wehman et al., 2014). As social contexts become more complex and social expectations grow, individuals with autism can become more vulnerable without intervention (Hendricks & Wehman, 2009; Howlin, 2014).

Individuals with autism often find it more difficult to create friendships, enter romantic relationships and successfully navigate social situations (Barnhill, 2007; Hendricks & Wehman, 2009; Tantum, 2014). Social difficulties can often lead to poorer mental health outcomes, with the most common mental health co-occurrence being social anxiety disorder (SAD). In the general population, SAD has an estimated lifetime prevalence rate ranging from 6.7% to 12.1% (Fehm et al., 2005; Kessler et al., 2005), whereas the prevalence of SAD in individuals with autism has been estimated to be significantly higher, with approximately 50% of adults with autism meeting the criteria for co-occurring diagnosis (Maddox et al., 2015). Core autism symptoms in social functioning and reciprocal social interactions may be the primary factor impacting the high co-occurrence of social anxiety in individuals with autism (White et al., 2014).

The efficacy of cognitive behavioural therapy (CBT) for individuals with autism has been examined in several reviews and meta-analyses; however, the evidence supporting the use of CBT interventions has mostly come from studies on children and adolescents (Binnie & Blainey, 2013; Lang et al., 2010; Menezes et al., 2020; Spain et al., 2017; Weston et al., 2016). Albeit limited, some CBT strategies commonly implemented in adolescent

---

Implications for practice and policy

1. This study provides qualitative and quantitative evidence suggesting that the Cognitive Behavioural Social Competence Therapeutic Intervention for Adults with Autism (CBSCTI-A) improves social competence.
2. Combining brief sessions of individual cognitive behavioural therapy and cognitive behavioural social skill group therapy in a manualised intervention appears to be feasible for adults with autism. Notably, satisfaction was rated very high and attrition rates were low.
3. Qualitative analysis suggests several participants experienced less anxiety and improved social skills as a result of completing CBSCTI-A. It is possible that improvements in social competencies could, by extension, lead to improvements in mental health symptoms.
4. Logical model appears to be a valuable tool for developing a multimodal CBSCTI-A.

---

interventions can extend their utility when adapted for adults with autism (Gantman et al., 2012; Laugeson et al., 2015). Specifically, manualised treatment modalities include didactic teaching, small group discussions, cognitive strategies, behavioural rehearsal, constructive feedback, homework, reviews and parent involvement (Laugeson & Park, 2014; Scattone & Mong, 2013; Spain & Blainey, 2015). These strategies have been used to improve social knowledge, reduce autism symptom severity and alleviate some comorbid psychiatric symptoms (Spain et al., 2017; Weston et al., 2016). The impact of combining individual and group CBT to improve social competencies in adults with autism is still somewhat unknown. To the authors' knowledge, only one study has reported evidence of feasibility and efficacy for a multimodal CBT intervention for individuals with autism, which included individual and group CBT aimed at reducing anxiety and improving social skills for adolescents with co-occurring anxiety disorder (White et al., 2013). Multimodal anxiety and social skills intervention appeared to be a feasible intervention and effective at increasing social skills; however, reductions in anxiety symptoms were not statistically significant.

There are very few studies that examine the effectiveness of CBT interventions with adults, as opposed to children with autism. Fewer studies have investigated the benefits of a multimodal CBT intervention which combines both individual and group CBT in a comprehensive manualised treatment approach. In line with recommendations from past research and engagement with the autism

community, a multimodal manualised CBT intervention was developed for adults with autism. The language used in this report was steered in part by preferences reported from people with autism across the globe of English-speaking nations (Keating et al., 2023) and the preferences of participants who took part in the study. The primary aim of this research was to investigate the feasibility of the Cognitive Behavioural Social Competence Therapeutic Intervention for Adults with Autism (CBSCTI-A). A secondary aim was to evaluate the possibility of therapeutic efficacy. It was hypothesised that the participants would demonstrate a significant increase in social competences evaluation scores after receiving CBSCTI-A.

2 | METHOD

2.1 | Design

A pragmatic mixed methods approach was used to evaluate the feasibility and efficacy of CBSCTI-A. Quantitative data were used to assess participants' satisfaction and capture behavioural changes in social competence. There were two strands of qualitative data collection: semistructured interviews with participants who received CBSCTI-A and semistructured interviews with two parents involved in supporting their children while receiving CBSCTI-A.

2.1.1 | Pre-/post-test design

Quantitative analysis was used only to explore the preliminary effects of CBSCTI-A and was not intended to prove or validate the effectiveness of the intervention. The dependent variables were scores from the Interaction Rating Scale Advanced (IRSA; Anme et al., 2014) and the Multidimensional Social Competence Scale (MSCS; Yager & Iarocci, 2013). Analysis was performed using the Statistical Package for Social Sciences (SPSS, v24.0).

2.1.2 | Qualitative data analysis

This study had a qualitative, exploratory and descriptive design. A qualitative enquiry using single-person semistructured interviews was made to explore the experiences of five young adults with autism who received CBSCTI-A, and their parents' experiences. An inductive approach to thematic analysis (TA) was used to describe or understand the human experience, context or phenomenon. Boyatzis (1998) describes TA as a combination of the language of qualitative research and quantitative research. TA is a useful and flexible method, which has been used regularly in recent cognitive behavioural intervention research to explore the experiences and views of service users (e.g., Dittmann & Jensen, 2014; Stawarz et al., 2018) and parents of service users (Shahnavaz et al., 2015). TA can be used to explore a range of epistemologies and is a valid method for identifying, analysing, organising, describing and reporting themes in qualitative research (Braun & Clarke, 2006; Nowell et al., 2017).

2.2 | Participants

Four male participants and one female participant with autism were recruited (Table 1). Two parents volunteered to take part in the study with their adult child. The participants' age range was between 18 and 29 years, with a mean age of 22.2 years. Participants were required to have had a past clinical diagnosis of autism from a reliable health professional. Diagnosis screening of a score of 26 or greater on the Autism-Spectrum Quotient (Baron-Cohen et al., 2001) was used to further qualify diagnosis. Participants were excluded if they reported the presence of a medical condition that may affect their ability to complete the full study or a history of neurological injury or were under the care of a neurologist or a neurosurgeon. In addition, participants were excluded if they reported a primary (most severe) mental health disorder or were experiencing significant drug or alcohol intoxication at the time of the intake.

TABLE 1 Participant demographic data.

Participant pseudonym (parents' pseudonym)	Age	Gender	Occupation or education status	Comorbid diagnosis	Psychotropic medications	IQ scores	AQ scores
Rick	22	Male	University student	Depression, anxiety, OCD, IBS	Fluoxetine 20 mg[a]	122.00	41
Clare (Sam)	21	Female	Unemployed	Depression, anxiety, PTSD, hypermobile, Irene Rett syndrome	None	107.00	41
Jim	21	Male	University student	Depression	Fluoxetine 40 mg[a] and Sertraline 100 mg[a]	103.00	38
Ken (Anne)	29	Male	Part-time employment	Depression, anxiety, dyspraxia	Sertraline 100 mg[a]	91.00	38
Alex	18	Male	University student	None	None	124.00	32

Abbreviations: OCD, obsessive-compulsive disorder; PTSD, post-traumatic stress disorder.

[a]Taken once daily.

3 | MATERIALS

3.1 | Screening instruments

3.1.1 | Autism-Spectrum Quotient (AQ; Baron-Cohen et al., 2001)

The AQ instrument is a self-evaluation scale that measures autistic traits across five subscales: social skills, attention shifting, attention to detail, communication and imagination. Higher scores represent more autism-related traits. Adolescents and adults with autism and neurotypical participants reported good internal consistency (0.82) and test–retest reliability (0.70) in a validation study. The AQ has good discriminative validity, and screening properties for autism in clinical samples with a minimum threshold score ranging between 26 and 32 have been found to support the presence of autism (Woodbury-Smith et al., 2005). This instrument was administered to participants with autism at baseline to support the self-reported clinical diagnosis.

3.1.2 | Wide Range Intelligence Test (WRIT; Glutting et al., 2000)

The WRIT is an individually administered test of ability designed for use with individuals between the ages of 4 and 85 years. The WRIT can be administered in less than 30 min and consists of four subtests (Verbal Analogies, Vocabulary, Matrices and Diamonds). These subsets can be combined to form three IQ scores which include Verbal IQ, Visual IQ and General IQs ($M=100$, $SD=15$). Scores below 70 may indicate an intellectual disability (Canivez et al., 2009), and, as such, a cut-off score of 70 was used in the current study. Internal consistency estimates (alpha coefficients) ranged from 0.76 to 0.97 across all age levels for the WRIT's subtests. Reliability estimates were found to be higher for General IQ, with a range of 0.93 to 0.97. Test–retest stability ranged from 0.70 for the Matrices subtest to 1.0 for Verbal Analogies and from 0.63 for Matrices to 0.90 for Verbal Analogies (uncorrected for attenuation). Convergent validity and construct validity have also been reported to be high for the WRIT (Canivez et al., 2009).

3.2 | Feasibility measures

3.2.1 | Client Satisfaction Questionnaire (CSQ-8; Larsen et al., 1979)

The CSQ-8 is a field standard measure of treatment satisfaction that has been widely employed to assess the acceptability of psychotherapy programmes. Predictive validity has been hypothesised and demonstrated by the presence of higher satisfaction scores for service completers as compared to noncompleters. The internal consistency of the CSQ-8, as measured by coefficient alpha, ranges

from 0.83 to 0.93, with values of 0.86 and 0.87 being reported in the two largest studies. The CSQ-8 is scored by calculating scores from individual items, ranging from 8 to 32. Higher scores indicate greater client satisfaction rates. Means, modes, medians and standard deviations involving a variety of approximately 8000 clients have been reported between 26.35 and 27.80 (Attkisson & Greenfield, 2004). As no set cut-off scores have been distinguished for specific boundary levels of satisfaction, this study used a cut-off score of 28 to represent high satisfaction rates.

3.2.2 | Fidelity checklists

Each item on the checklist corresponded to the components being delivered within each session. A yes/no response option was provided for each checklist item based on the following: yes, if activity was performed and for the time allocated; no, if activity was not performed or not within the time allocated. In addition, observations were noted if the programme format was not adhered.

3.3 | Social competence measures

3.3.1 | Interaction Rating Scale Advanced (IRSA; Anme et al., 2014)

The IRSA is a 92-item instrument designed as a brief but comprehensive observation measure that assesses basic social competence for individuals over the age of 15. Social competence is examined through 5-min observations of a social interaction. The advantage of the IRSA is that evaluations of interactions can be completed in a short period within a naturalistic environment. The IRSA has demonstrated a Cronbach's alpha value of 0.89 and a moderately high correlation ($r=.58$) between the IRSA scores and professionals' practical evaluation. The IRSA includes a behavioural score and six subscales scores that, when combined, provide an impression score: 'self-control', 'expressivity', 'sensitivity', 'assertiveness', 'responsiveness' and 'regulation'. Items are assessed in terms of the presence of a behaviour (0—no, 1—yes), and the sum of all subscale items provides the overall score. The total score can range from 0 to 92 (Anme et al., 2014). Higher scores represent greater mastery of observed social competence.

3.3.2 | Multidimensional Social Competence Scale (MSCS; Yager & Iarocci, 2013)

The MSCS is a measure administered to primary caregivers or as a self-report. The scale includes 77 items rated on a Likert scale ranging from 1 ('not true or almost never true') to 5 ('very true or almost always true'). Items are coded such that higher scores reflect higher levels of social competence. Internal consistency has been supported with coefficient alpha reliabilities for domain, subscale

and total scores being reported above 0.84. Convergent validity has been reported, with a significantly large correlation being reported between the MSCS total score and the SRS (Constantino & Gruber, 2005). The mean score for an autism population has been reported for total MSCS at 216.2, with a standard deviation of 38.9.

3.4 | Procedure

3.4.1 | Intervention development

The development of CBSCTI-A is outlined using the logical model for programme development (Savaya & Waysman, 2005), which acts to communicate and support the actions that were required to achieve the intervention objectives (Figure 1). The process of the

logical model development consisted of four stages: inputs, activities, outputs and outcomes. The first stage was exploratory, with the objective of assessing existing data sources and collecting input through consultations with the autism community. At this stage, the main objectives were to identify and define specific evidence-based strategies, techniques and topics adapted for autism and to collect project feedback from the autism community.

3.4.2 | Intervention

CBSCTI-A is a manual-based programme, which is delivered over 6 weeks (15 h) through two therapy modalities: individual CBT and cognitive behavioural group social skill sessions. Individual CBT sessions were attended 48 h prior to the delivery of group sessions.
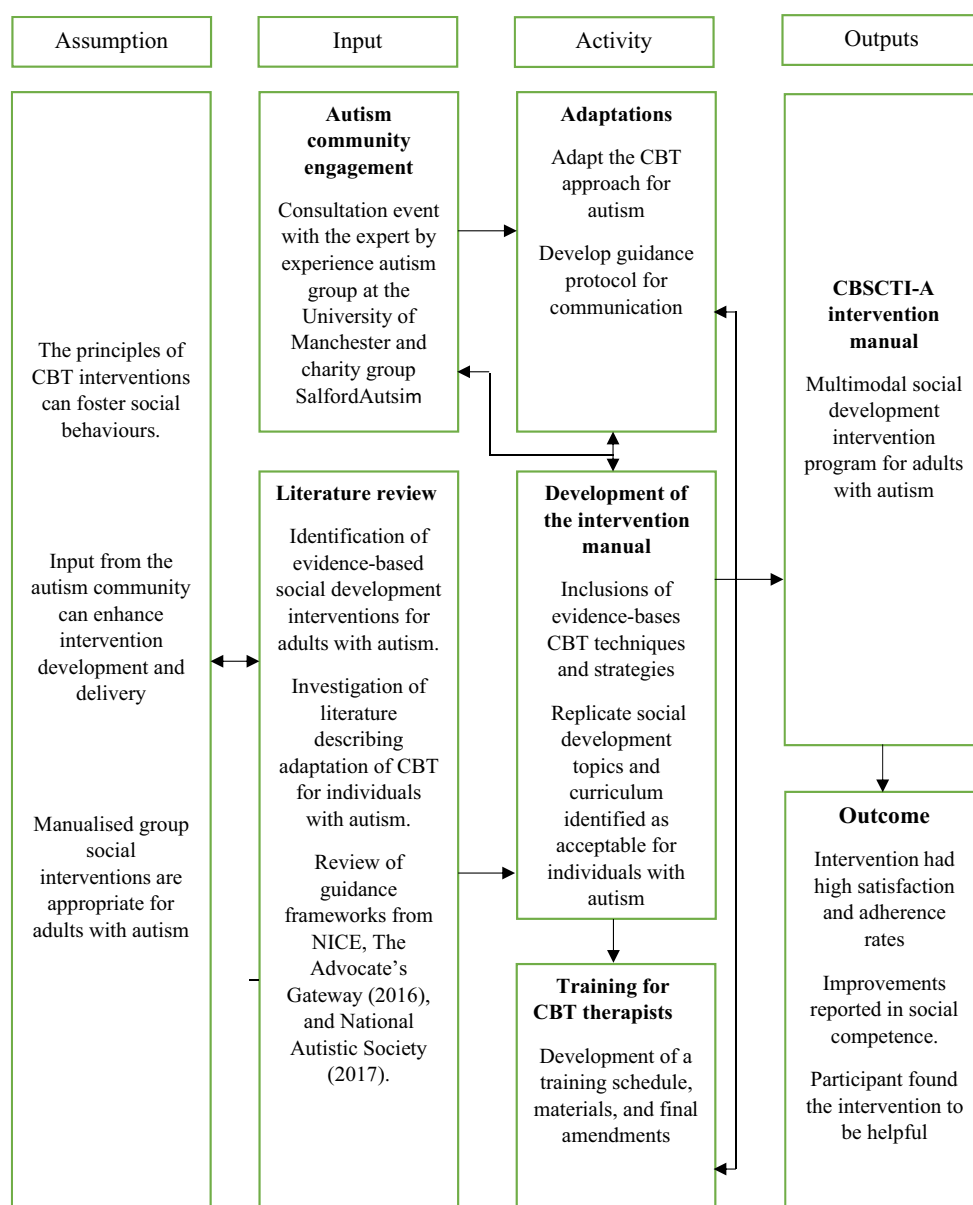

FIGURE 1 CBSCTI-A programme development.

Individual therapy sessions were approximately 30 min in length, with the optional inclusion of parents for approximately 10 min towards the end of each session.

The group therapy sessions each lasted approximately 2 h with a 10-min break. CBT strategies and techniques used in group sessions include the following: behaviour modelling, role-play, problem-solving and psycho-education. The curriculum includes only the operational definitions of social skills (verbal and non-verbal) found in the literature with an evidence base. Psycho-education lessons cover six social interaction topics: starting a conversation, entering a group conversation, exchanging topic-relevant information, making a request, active listening, sharing the interaction and good sportsmanship skills, for example, fairness, respect and graciousness in winning or losing.

3.5 | Autism-related adaptations

Adaptations included reducing the number of sessions, shortening the length of sessions, the use of visual aids and structured activities (Rao & Gagie, 2006; Scattone & Mong, 2013). For a structured formulation with visual representation, the Five Areas CBT model (Williams, 2001) was adapted to fit within the remit of the individual CBT sessions. Changes in the model include providing a visual representation of issues related to social impairment in the form of a pie chart (Figure 2). In addition, a guidance protocol for communicating with adults with autism was developed for the CBT therapists to help facilitate interactions.

3.5.1 | Setting

University department facilities were utilised for conducting the intervention and assessments. The therapy room used to facilitate the intervention was a large open space equipped with a whiteboard, a computer and a projector screen. In the middle of
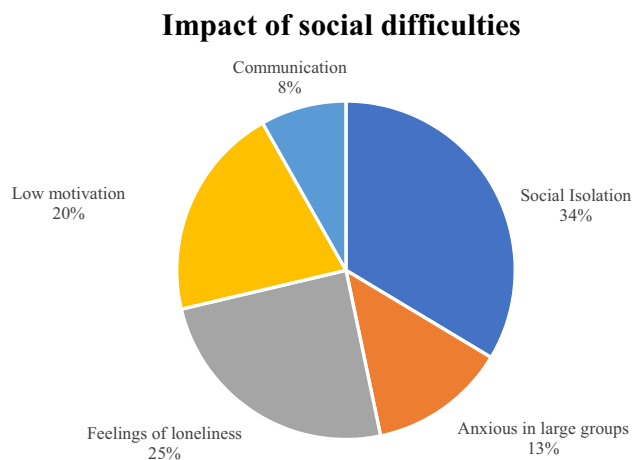

Impact of social difficulties

FIGURE 2 Example of pie chart of social difficulties.

the room, eight chairs formed a group circle. In each corner of the room, chairs were strategically placed, so they could be easily accessed for break-out group activities. The observation suite was used to conduct assessments. The suite was complete with a comfortable testing laboratory and a control room with multirecording video from controllable cameras and a microphone to communicate with participants in the testing laboratory from the control room. The control room included a two-way mirror for observation-based investigations in the testing laboratory. The testing laboratory was furnished with a soft armchair, a sofa and a small table with four chairs.

3.6 | Data collection and analysis

3.6.1 | Social competence assessments

Participants were asked to complete two social competence assessments before and after completing CBSCTI-A. The first assessment required participants to complete the MSCS self-report questionnaire. Following the completion of the MSCS questionnaire, a social interaction task was administered in an observation suite at the University of Salford campus. The social interaction task was video-recorded for the purpose of observer-rated assessments. This task was developed specifically for use with the IRSA observer-rated assessment instrument manual. Participants were asked to start a conversation with a unknown confederate volunteer without autism while playing a classic game of Tumble Tower. Before participants began the game, the researcher provided detailed instructions on how to set up the tower and play. Participants had 5 min to play the game and interact with their neurotypical confederate. During the task, no researcher was in the room where the game was played. Participants were aware they were being video-recorded with four covert video cameras. Researchers observed through a two-way mirror in an observation suite. The timing for each video was predefined and automatically stopped recording after a 5-min duration. Two research assistants completing a master's degree were recruited to complete observer-rated manualised assessments. A total of 10 video recordings of the dyadic interactions were assessed. Both research assistants were blinded to the condition of the assessment (pre/post). Ratings between assessors were compared, and disagreements were discussed until 100% consensus was obtained.

3.6.2 | Feasibility

Feasibility was assessed by monitoring fidelity, recording attendance and analysing participant satisfaction. In order to record intervention adherence rates, the researcher kept an attendance log for all individual CBT sessions and group sessions. For data to be included in the study analysis, participants had to maintain a minimum of 80% overall adherence rate (a minimum of 12 of 15 h of therapy). Upon

the completion of treatment, the participants were administered a short Client Satisfaction Questionnaire (CSQ; Larsen et al., 1979). The CSQ is a self-report instrument, which only takes about 5 min to complete. To ensure rigour of the intervention, adherence to the CBSCTI-A manual was monitored by a single observer using a fidelity checklist.

3.6.3 | Efficacy

The MSCS and IRSA assessment measures were carried out approximately 1 week before and 1 week after the delivery of CBSTI-A. Reliable Change Indices (RCIs; Jacobson & Truax, 1991) were computed to determine whether change in the MSCA and IRSA scores from pre-intervention to postintervention was significant for each of the participants. RCIs are usually regarded as standardised scores, and therefore, an RCI larger than 1.96 will occur in less than 5% of cases (Zahra & Hedge, 2010). Therefore, RCI values greater than 1.96 indicate statistically significant and clinically meaningful change. Further analyses were performed on the pre- and postintervention scores of the MSCS and IRSA to determine whether changes at a group level were statistically significant.

3.6.4 | Semistructured interviews

Four of the participants and two parents involved in the intervention completed full interview schedules. All interviews were recorded using a digital recorder device. Semistructured interviews were transcribed by the researcher using intelligent verbatim, and the analysis process involved coding, categorising chunks of data and making sense of the essential meanings of the phenomenon (Bernard et al., 2016). The transcripts were analysed using TA. The six stages of the analysis involved familiarisation of the data, initial code generations, searching for themes, reviewing themes, defining and naming themes and generating the final report (Braun & Clarke, 2006). An inductive approach to TA aimed to keep emerging themes grounded in the original data and to help reduce the influence of the researchers' existing knowledge and preconceptions.

Coding and analysis were conducted primarily on a semantic level. Appose to adopting postpositivism or constructivism in two different ontological and epistemological camps, pragmatism asks the researcher to focus on the two different approaches to inquiry (Morgan, 2014). The foundations behind pragmatist epistemology are that knowledge is always based on experience, and an individual's perceptions of the world are shaped by social experiences (Kaushik & Walsh, 2019). Pragmatist epistemology views knowledge as constructed with a purpose to better manage one's existence and to take part in the world using both formal and informal rhetoric (Creswell & Plano Clark, 2011).

4 | RESULTS

4.1 | Feasibility analysis

Feasibility of CBSCTI-A was supported within three fields, as shown in Figure 3. Fidelity to the intervention manual objectives for each session ranged from ~86% to 100% over the six group therapy sessions. Overall, client satisfaction rates were very high based on scores from the CSQ-8 (mean score 30.20/standard deviation 1.09). For all five participants, overall satisfaction was calculated at 94% postintervention. Adherence rates were also high, with four of the five participants attending ~100% of all the intervention sessions. One participant attrition accounted for missing three of 15 h of therapy. Overall adherence rates were recorded at 90%.

4.2 | Data screening and analysis

4.2.1 | Analysis of MSCS Self-Report

The mean and standard deviation for the MSCS total scores and subset scores were calculated and are shown in Table 2.

The inspection of the mean total MSCS scores of both conditions suggests that there were linear increases in social competence. The standard deviation values show a greater spread of scores at pre-test than scores calculated at post-test. Related t-test shows a significant increase in total MSCS scores from pre-test to post-test: $t(4) = -2.85$, $p = .02$ (Table 3). On the subscale domains, participants demonstrated significantly higher scores from pre-test to post-test in social motivation: $t(4) = -0.73$, $p = .02$; emotional regulation: $t(4) = -2.43$, $p = .04$; and non-verbal conversation: $t(4) = -2.06$, $p = .05$.

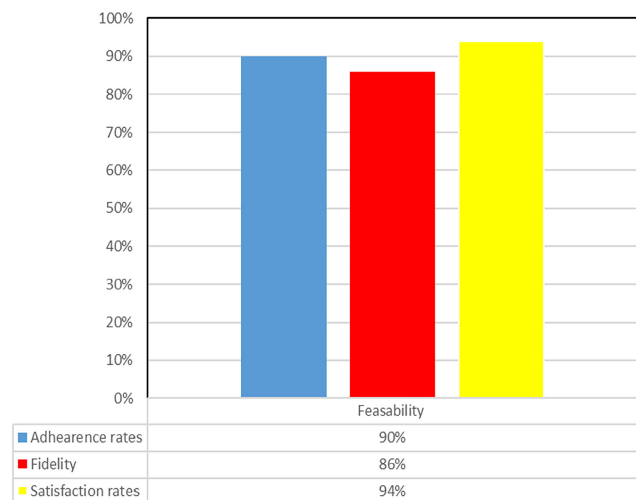|	Feasability
■ Adhearence rates	90%
■ Fidelity	86%
■ Satisfaction rates	94%

FIGURE 3 Feasibility assessment report.

TABLE 2 Mean and standard deviation of the MSCS scores.

MSCS domains	Mean (standard deviation)	
	Pre-test	Post-test
Social motivation	31.40 (10.62)	36.20 (8.79)
Social inferencing	35.40 (8.33)	37.20 (7.89)
Empathy	38.20 (8.29)	41.40 (4.72)
Social knowledge	40.60 (8.68)	42.80 (3.90)
Verbal conversation	35.00 (7.28)	34.80 (1.10)
Non-verbal conversation	39.40 (3.21)	42.20 (3.83)
Emotional regulation	29.00 (9.41)	34.40 (10.41)
Total MSCS scores	249.00 (34.02)	269.00 (19.01)

TABLE 3 Related t-test analysis results of the MSCS total and subset domains.

Variable	t-Values	Effect size	Significance
Social motivation	−2.848	0.49	.02
Social inferencing	−0.726	0.22	.25
Empathy	−1.573	0.47	.10
Social knowledge	−0.736	0.25	.25
Verbal conversation	0.058	0.03	.48
Non-verbal conversation	−2.064	0.79	.05
Emotional regulation	−2.425	0.54	.04
Total MSCS	−0.545	0.72	.02

Note: Based on one-tailed t-test analysis. Effect size measured using Cohen's d.

4.2.2 | Analysis of IRSA observer-rated assessment

The median and interquartile range for the IRSA total scores and subset scores were calculated and are shown in Table 4.

To check whether the data met the assumptions for parametric analysis, the level of measurement of dependent variables was considered and the histogram shape of frequency was visually inspected. As the normality assumption appeared to be violated on several subset scores, a nonparametric test was carried out. The Wilcoxon signed-rank test indicates that the median scores from pre to post on the IRSA total scores statistically significantly increased: $Z = 15$, $p = .02$. Analysis of subscale scores indicates that there was a statistically significant increase from pre- to post-test in domains of assertiveness: $Z = 15$, $p = .02$; interpersonal relationships: $Z = 15$, $p = .01$; self-control: $Z = 10$, $p = .03$; and sensitivity: $Z = 6$, $p = .05$ (Table 5).

4.2.3 | Reliable change indices

Analysis of RCI's for the MSCS total and subscale scores and the IRSA total scores pre-/postintervention effect for individual participants are reported in Table 6.

5 | QUALITATIVE FINDINGS

Thematic analysis generated the following four overarching themes: satisfaction with CBSCTI-A; important components of CBSCTI-A; challenges and critiques; and recommendations. Themes and combined subthemes can be seen in Table 7.

5.1 | Theme 1. Satisfaction with CBSCTI-A

5.1.1 | Enjoyed the intervention

Experiences of the intervention discussed by the participants were positive. Many comments provided a description which elucidated specific aspects of what they enjoyed most about the intervention.

> I enjoyed the social element, alongside having various weekly goals. We became a good group and we have kept in contact since.
>
> (Ken)

> I made friends that I would not have made otherwise.
>
> (Clare)

5.1.2 | Intervention was helpful

Everyone interviewed described some part of the intervention as helpful.

> There was lots that was helpful about the intervention… I think the counselling sessions were most helpful… Sandy educated me about the world of OCD, which is something I suffer from. We worked together over a number of weeks to build understanding of the condition and what I can do to prevent such frustration. She was very helpful.
>
> (Rick)

> I do more socialising such as eating in the kitchen in the halls when others are around. Before the intervention I would avoid the kitchen if others were around and wait to eat until everyone was gone.
>
> (Alex)

5.1.3 | Would recommend to others

All of the participants interviewed said that they would recommend the intervention to others.

> I would definitely recommend this intervention to other autistic people. It builds confidence but also

TABLE 4 Median and interquartile range of the IRSA scores.

Variable	Pre-test median	Post-test median	Pre-test interquartile range	Post-test interquartile range
Expressivity	7	8	6	3
Assertiveness	4	8	5	3
Sensitivity	4	6	3	4
Acceptance	8	8	3	3
Interpersonal relationship	8	12	1	2
Self-control	15	18	6	2
Total IRSA	47	56	12	10

TABLE 5 Results of the pre-/post-test Wilcoxon signed-rank test.

Pre-/post-test variables	Z statistic	Significance
Expressivity	5	.14
Assertiveness	15	.02
Sensitivity	6	.05
Acceptance	2	.29
Interpersonal relationship	15	.01
Self-control	10	.03
Total IRSA pre-test	15	.02

Note: Based on one-tailed analysis.

> polished my social skills. You are a very knowledgeable practitioner and it was good to get to know you. Counsellors Sandy and Alan were also a delight to get to know and their counselling was most useful.
>
> (Rick)

5.2 | Theme 2. Important components of CBSCTI-A

5.2.1 | Parent involvement

There were benefits to having a parent involved in the intervention. Parents played a supportive role for their children during the intervention. Sam believed that without her support, Clare would not have attended the group component due to her anxiety.

> For me it was helping Clare to get there, she would not have gone to the group session unless I had taken her in, and I had been in the building. She needs to know I was in the building.
>
> (Sam)

5.2.2 | Group sessions

Group sessions account for approximately 80% of the intervention. The group sessions were a key component for learning and practising new social skills.

> I preferred the group.... learning different techniques were quite useful.
>
> (Ken)

> ...the group sessions let me practise social skills, which I eventually used to help be more social in the halls of residence.
>
> (Alex)

5.2.3 | Individual CBT sessions

Individual sessions were reported to be helpful for setting targets and working on anxiety.

> The individual sessions were really good to set targets and work on my anxiety and the group session let me practise social skills, which I eventually used to help be more social in the halls of residence.
>
> (Alex)

5.3 | Theme 3. Challenges and critiques

5.3.1 | Individual sessions were less helpful

Clare expressed a dislike for the individual CBT sessions.

> I didn't like it because the type of counselling it was, well it was the face everything directly, that sort of stuff.
>
> (Clare)

5.3.2 | Improvements seen in individual therapy were not long term

Clare felt that while she did improve when attending sessions, the root of the problem still existed.

> I had to go stand outside my old school which wasn't nice. I do feel that even though I did get

TABLE 6 RCI values.

| Participants | MSCS RCI values | | | | | | | | IRSA RCI values |
	Social motivation	Social inference	Empathy	Social knowledge	Verbal conversation	Non-verbal conversation	Emotional regulation	MSCS total	IRSA total
Jim	1.30	0.24	2.70[a]	0.408	-1.07	0.51	3.17[a]	3.16[a]	2.38[a]
Clare	1.48	-0.94	1.35	2.65[a]	2.57[a]	1.54	0.45	4.11[a]	1.85
Rick	1.30	2.59[a]	-0.54	-1.02	-0.21	2.05[a]	1.13	2.00[a]	2.38[a]
Ken	-0.19	0.00	0.27	0.41	0.21	3.59[a]	0.91	1.48	5.83[a]
Alex	0.56	0.24	0.54	-0.20	-1.71	-0.51	0.45	-0.21	2.12[a]

Abbreviation: RCI, reliable change indices.

[a]RCI > 1.96.

better at doing it over time and I did do it a lot, it is not like the reason for not wanting to do it disappeared. So now that I have stopped doing it daily, the anxiety is back every time we pass the school. So, nothing has changed like that, and I still try to dodge teenagers, I still don't like touching things, so yeah, it just wasn't the type of counselling that worked on me.

(Clare)

5.3.3 | Some group sessions were less helpful

One participant highlighted the challenges of developing an intervention for individuals with a spectrum of social abilities.

There may have been a few moments during the intervention where it was a little repetitive and a little basic. However, I appreciate why this was required.... The skills training was interesting, but slightly repetitive as I am well practised at this and feel assured in this setting.

(Rick)

5.4 | Theme 4. Recommendations

5.4.1 | Include new topics

During her interview, Clare discussed her experience of starting to date and that the topic of romantic relationships was very important, yet she understood little about dating behaviours.

It is a big part of life and you don't get lessons on it in school and for an autistic person that doesn't understand socialising in the first place, well then it's a whole different ball game. You just don't understand how to do it.

(Clare)

5.4.2 | Should include more girls

Clare's mother, Sam, believed that more girls were needed in the social skills group.

I would say there was only one thing and that was that Clare was the only girl. I know you had problems getting girls in but I think, we both thought, it would have been good for her to have another girl. She would have felt more comfortable quicker and settled.

(Sam)

TABLE 7 Themes and subthemes.

Themes	Subthemes
Satisfaction with CBSCTI-A	Enjoyed the intervention Intervention was helpful Would recommend to others
Important components of CBSCTI-A	Parent involvement Group discussions Individual sessions
Challenges and critiques	Felt individual sessions were less helpful Improvements seen in individual therapy were not long term Some group sessions were less helpful
Recommendations	Include new topic Should include more girls More one-to-one support Change task

5.4.3 | More one-to-one support

Ken's mother, Anne, felt he would benefit from an intervention with more individualised support.

> I think Ken could have done with more one-to-one support. He saw that chap and that lady once didn't he, but more of that would have been good.
>
> (Anne)

5.4.4 | Change task

Rick found the phone-roster task anxiety-provoking, and he believed providing a topic to discuss each week could have made the task easier.

> The request to "speak on the phone" may have been aided with subjects to talk about. It was a little too broad, which I think created anxiety for participants.
>
> (Rick)

6 | DISCUSSION

The primary objective of this study was to assess the feasibility of delivering CBSCTI-A to adults with autism. The participant satisfaction rates and adherence to intervention were recorded at 94% and 90%, respectively. High attendance rates were particularly promising as several participants in the sample lived independently or semi-independently and were responsible for their own attendance. Very high satisfaction rates were reported, and semistructured interviews revealed that the participants would recommend the programme to other young adults with autism. All participants interviewed believed that the intervention or parts of the intervention were helpful. In addition, therapist fidelity to adhere to the CBSCTI-A objectives was calculated to be high at 86%.

A secondary objective was to investigate the efficacy of CBSCTI-A. Preliminary results supporting the efficacy of CBSCTI-A were somewhat promising. RCI analysis revealed that three participants demonstrated significant increases in MSCS scores. Four participants demonstrated significant improvements on at least one of the MSCS subdomain scales; however, there was significant variability. Related *t*-test analysis showed significant group improvements in social motivation, emotional regulation and total MSCS scores. RCI analysis of observer-rated assessments revealed significant improvements on the total IRSA scores for four participants. The Wilcoxon signed-rank test analysis of the observer-rated IRSA assessments demonstrated significant group gains in assertiveness, self-control, interpersonal relationship skills and social sensitivity.

Anecdotal data revealed some support towards intervention feasibility. CBSCTI-A was seen by participants as a bonding experience that fostered friendships. Participants interviewed expressed satisfaction with the intervention and reported feeling the intervention was of benefit. Notably, participants reported feeling less anxiety and more confident in using their social skills. Some participants said they felt more motivated to engage in social interactions as a result of the interventions. During their respective interviews, parents reported that they believed improvements were made over the course of the intervention. Social motivation, acceptance, independence and social etiquette were perceived to have improved after completing CBSCTI-A.

6.1 | Clinical implications

Improvements in social skills have been shown to help improve mental health symptoms (White et al., 2013). Cognitive behavioural interventions have also been shown to improve mood disorder and anxiety disorder symptoms of adolescents and young adults with autism (McVey et al., 2016; Schiltz et al., 2018). It is possible that improvements in social competencies as a result of CBSCTI-A could, by extension, lead to improvements in mental health symptoms. Some anecdotal data suggest that participants felt their mental health symptoms improved over the course of the intervention. However,

one participant felt that improvements were not sustained long term. Long-term follow-up studies investigating the impact of social skill CBT interventions have had mixed findings, suggesting some level of continued support may be necessary to maintain improvements (Mandelberg et al., 2014; White et al., 2010).

The scope for delivering the intervention in easily accessible community or educational settings needs further consideration. There are significant challenges that need to be considered when delivering a multimodal therapeutic intervention. Co-ordinating both group and individual CBT therapy sessions may present distinctive logistical and care provider challenges. CBSCTI-A currently requires more than one specialist clinician, and the duration and frequency of sessions may limit application across settings.

6.2 | Research limitations

Some potential limitations warrant consideration. The first notable limitation of this study is the small sample size, limiting the certainty with which quantitative results can be interpreted. A further limitation is that all participants opted into the study by self-referral. This could have represented a subset of adults with autism who have more intrinsic motivations for sociability and are able to better cope with group situations without the need for caregiver support.

The confederates involved in the social interactions during testing were not autistic, and this could have impacted the results. Milton (2012) describes the double-empathy problem, where often there is a breakdown in mutual understanding during social interactions between those with autism and neurotypical individuals. The double-empathy hypothesis states that neurotypical people can find it just as difficult empathising with neurodiverse people and that empathy difficulties arise from different ways of communication (Chown et al., 2020; Milton, 2012). It has been suggested that these communication breakdowns can contribute to the social difficulties experienced by people with autism (Sasson et al., 2017; Sheppard et al., 2016).

Assessing autism-specific intervention effects in adults may offer some difficulties that are not typically found with interventions for children or youths. The severity of autism symptoms also tends to be less evident in adulthood than in childhood (Howlin, 2014), so social skill improvements may be more subtle and difficult to detect. The MSCS self-report assessment used in this study was validated with a large sample of adolescents and young adults with autism (Trevisan et al., 2018), but its sensitivity to detect changes or unique characteristics in adult autism populations over the age of 25 years is somewhat unknown.

Often, researchers are also reliant on assessments that were not specifically developed for an adult autism population (Brugha et al., 2016). For example, in the current study, the IRSA observer-rated assessment has been shown to measure social competence in adults with high validity and reliability (Anme et al., 2014), yet the tool has only been used as an intervention outcome measure in a select few adult autism studies (e.g., Higashida et al., 2019; Munesue et al., 2016). To date, objective observer-rated adult autism assessments are limited, and a lack of valid psychometric outcome tools

sensitive to change has been a continued limitation for studies investigating intervention efficacy in this field (Baker-Ericzén et al., 2018; Bishop & Lord, 2023). Without the new development and the consistent use of high-quality outcome measures in autism intervention research, evidence of efficacy between and across interventions may limit the ability to reliably report evidence of change.

6.3 | Future research directions

More robust large-scale trials will be necessary before conclusions of efficacy can be established. It is important to implement CBSCTI-A in different settings with more diverse samples. A true randomised controlled design with multiple control conditions (e.g., treatment-as-usual control group, intervention control group and wait list control group) would be the most rigorous way to test the efficacy of CBSCTI-A. Delivery of CBSCTI-A in community and educational settings where young adults are more likely to be preparing for the transition into adulthood will be an important consideration for future studies.

Due to the scope of the study, only social competencies outcome measures were used to determine efficacy. Research has shown that group CBT also has the potential to reduce stress in individuals with autism (Spain et al., 2017; Weston et al., 2016). Further investigations on the effect of CBSCTI-A on mental health symptoms with long-term follow-up assessments are needed to determine the therapeutic utility of the intervention.

When developing CBSCTI-A, the goal was to support natural therapeutic change and not try to change individuals to better fit into society. Some social skill behavioural interventions may be at risk of simply teaching individuals how to camouflage features of autism (Mitchell et al., 2021). It is well-documented that efforts to 'camouflage' or attempt to mask autism characteristics to blend in with others is common and that camouflaging has been identified as a potential risk factor for mental health issues and even suicide (Hill & Katusic, 2020). While not the intention of any researcher developing such interventions, these views should be considered to avoid the risk of inadvertently contributing to future mental health problems.

Lastly, recent research investigating the double-empathy hypothesis suggests that individuals with autism are possibly more able and comfortable when communicating with autistic peers; however, there is little evidence to explain this occurrence. The double empathy theory suggests that there are distinct mechanisms shared by individuals with autism, which help them understand the world and connect with other autistic people (Milton, 2012). Understanding these mechanisms may bring further clarification to the reasons for mutual misunderstandings and insight into improving social interactions.

7 | CONCLUSION

There are very few evidence-based social competence interventions developed specifically for adults with autism. Most intervention efforts have focussed on youth populations, yet many individuals with autism encounter significant challenges in adulthood. This study

provides both qualitative and quantitative preliminary evidence to support the delivery of CBSCTI-A within an adult autism population. While CBSCTI-A was found to be acceptable and feasible for adult autism populations, larger, more rigorous trials are needed before efficacy can be fully established.

ACKNOWLEDGEMENTS

CONFLICT OF INTEREST STATEMENT

The authors report no conflicts of interest.

ORCID

David Tate 🔟 https://orcid.org/0000-0002-0572-0715
Linda Dubrow-Marshall 🔟 https://orcid.org/0000-0003-4092-6599

REFERENCES

American Psychiatric Association. (2022). Neurodevelopmental disorders. In *Diagnostic and statistical manual of mental disorders* (5th ed., text revised, pp. 31–86). American Psychiatric Association.

Anme, T., Tokutake, K., Tanaka, E., Watanabe, T., Tomisaki, E., Mochizuki, Y., Wu, B., Shinohara, R., Sugisawa, Y., Okazaki, S., & Sadato, N. (2014). Validity and reliability of the Interaction Rating Scale Advanced (IRSA) as an index of social competence development. *Public Health Research*, 4(1), 25–30.

Attkisson, C. C., & Greenfield, T. K. (2004). The UCSF Client Satisfaction Scales: I. The Client Satisfaction Questionnaire-8. In M. E. Maruish (Ed.), *The use of psychological testing for treatment planning and outcomes assessment: Instruments for adults* (pp. 799–811). Lawrence Erlbaum Associates Publishers.

Baker-Ericzén, M. J., Brookman-Frazee, L., & Brodkin, E. S. (2018). Accelerating research on treatment and services for transition age youth and adults on the autism spectrum. *Autism*, 22(1), 2–5.

Barnhill, G. P. (2007). Outcomes in adults with Asperger syndrome. *Focus on Autism and Other Developmental Disabilities*, 22(2), 116–126.

Baron-Cohen, S., Wheelwright, S., Skinner, R., Martin, J., & Clubley, E. (2001). The autism-spectrum quotient (AQ): Evidence from asperger syndrome/high-functioning autism, malesand females, scientists and mathematicians. *Journal of Autism and Developmental Disorders*, 31(1), 5–17.

Bernard, H. R., Wutich, A., & Ryan, G. W. (2016). *Analyzing qualitative data: Systematic approaches*. SAGE Publications.

Binnie, J., & Blainey, S. (2013). The use of cognitive behavioural therapy for adults with autism spectrum disorders: A review of the evidence. *Mental Health Review Journal*, 18(2), 93–104.

Bishop, S. L., & Lord, C. (2023). Commentary: Best practices and processes for assessment of autism spectrum disorder–The intended role of standardized diagnostic instruments. *Journal of Child Psychology and Psychiatry*, 64, 834–838.

Boyatzis, R. E. (1998). *Transforming qualitative information: Thematic analysis and code development*. Sage.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.

Brugha, T. S., Spiers, N., Bankart, J., Cooper, S. A., McManus, S., Scott, F. J., Smith, J., & Tyrer, F. (2016). Epidemiology of autism in adults across age groups and ability levels. *The British Journal of Psychiatry*, 209(6), 498–503.

Canivez, G. L., Konold, T. R., Collins, J. M., & Wilson, G. (2009). Construct validity of the Wechsler Abbreviated Scale of Intelligence and Wide Range Intelligence Test: Convergent and structural validity. *School Psychology Quarterly*, 24(4), 252.

Chown, N., Hughes, L., & Baker-Rogers, J. (2020). What about the other side of double empathy? A response to Alkhaldi, Sheppard and Mitchell's JADD article concerning mind-reading difficulties in autism. *Journal of Autism and Developmental Disorders*, 50(2), 683–684.

Constantino, J. N., & Gruber, C. P. (2005). *Social responsiveness scale (SRS)*. Western Psychological Services.

Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Sage.

Dittmann, I., & Jensen, T. K. (2014). Giving a voice to traumatized youth—Experiences with trauma-focused cognitive behavioral therapy. *Child Abuse & Neglect*, 38(7), 1221–1230.

Fehm, L., Pelissolo, A., Furmark, T., & Wittchen, H. U. (2005). Size and burden of social phobia in Europe. *European Neuropsychopharmacology*, 15(4), 453–462.

Gantman, A., Kapp, S. K., Orenski, K., & Laugeson, E. A. (2012). Social skills training for young adults with high-functioning autism spectrum disorders: A randomized controlled pilot study. *Journal of Autism and Developmental Disorders*, 42, 1094–1103.

Glutting, J., Adams, W., & Sheslow, D. (2000). *Wide range intelligence test: WRIT*. Wide Range.

Hendricks, D. R., & Wehman, P. (2009). Transition from school to adulthood for youth with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities*, 24(2), 77–88.

Higashida, H., Munesue, T., Kosaka, H., Yamasue, H., Yokoyama, S., & Kikuchi, M. (2019). Social interaction improved by oxytocin in the subclass of autism with comorbid intellectual disabilities. *Diseases*, 7(1), 24.

Hill, R. M., & Katusic, M. (2020). Examining suicide risk in individuals with autism spectrum disorder via the interpersonal theory of suicide: Clinical insights and recommendations. *Children's Health Care*, 49(4), 472–492.

Howlin, P. (2014). Outcomes in adults with autism spectrum disorders. In F. R. Volkmar, K. A. Pelphrey, R. Paul, & S. J. Rogers (Eds.), *Handbook of autism and pervasive developmental disorders* (4th ed., pp. 97–116). Wiley.

Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology*, 59, 12–19.

Kaushik, V., & Walsh, C. A. (2019). Pragmatism as a research paradigm and its implications for social work research. *Social Sciences*, 8(9), 255.

Keating, C. T., Hickman, L., Leung, J., Monk, R., Montgomery, A., Heath, H., & Sowden, S. (2023). Autism-related language preferences of English-speaking individuals across the globe: A mixed methods investigation. *Autism Research*, 16(2), 406–428.

Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62(6), 617–627.

Lang, R., Regester, A., Lauderdale, S., Ashbaugh, K., & Haring, A. (2010). Treatment of anxiety in autism spectrum disorders using cognitive behaviour therapy: A systematic review. *Developmental Neurorehabilitation*, 13(1), 53–63.

Larsen, D. L., Attkisson, C. C., Hargreaves, W. A., & Nguyen, T. D. (1979). Assessment of client/patient satisfaction: Development of a general scale. *Evaluation and Program Planning*, 2, 197–207.

Laugeson, E. A., Gantman, A., Kapp, S. K., Orenski, K., & Ellingsen, R. (2015). A randomized controlled trial to improve social skills in young adults with autism spectrum disorder: The UCLA PEERS® program. *Journal of Autism and Developmental Disorders*, 45, 3978–3989.

Laugeson, E. A., & Park, M. N. (2014). Using a CBT approach to teach social skills to adolescents with autism spectrum disorder and other social challenges: The PEERS® method. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, 32, 84–97.

Maddox, B. B., Brodkin, E. S., Calkins, M. E., Shea, K., Mullan, K., Hostager, J., Mandell, D. S., & Miller, J. S. (2017). The accuracy of the ADOS-2 in identifying autism among adults with complex psychiatric conditions. *Journal of Autism and Developmental Disorders*, 47(9), 2703–2709.

Maddox, B. B., & White, S. W. (2015). Comorbid social anxiety disorder in adults with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 45, 3949–3960.

Maenner, M. J., Shaw, K. A., Bakian, A. V., Bilder, D. A., Durkin, M. S., Esler, A., Furnier, S. M., Hallas, L., Hall-Lande, J., Hudson, A., Hughes, M. M., Patrick, M., Pierce, K., Poynter, J. N., Salinas, A., Shenouda, J., Vehorn, A., Warren, Z., Constantino, J. N., ... Cogswell, M. E. (2021). Prevalence and characteristics of autism spectrum disorder among children aged 8 years—Autism and developmental disabilities monitoring network, 11 sites, United States, 2018. *MMWR Surveillance Summaries*, 70(11), 1–16.

Mandelberg, J., Laugeson, E. A., Cunningham, T. D., Ellingsen, R., Bates, S., & Frankel, F. (2014). Long-term treatment outcomes for parent-assisted social skills training for adolescents with autism spectrum disorders: The UCLA PEERS program. *Journal of Mental Health Research in Intellectual Disabilities*, 7(1), 45–73.

McVey, A. J., Dolan, B. K., Willar, K. S., Pleiss, S., Karst, J. S., Casnar, C. L., Caiozzo, C., Vogt, E. M., Gordon, N. S., & Van Hecke, A. V. (2016). A replication and extension of the PEERS® for young adults social skills intervention: Examining effects on social skills and social anxiety in young adults with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 46(12), 3739–3754.

Menezes, M., Harkins, C., Robinson, M. F., & Mazurek, M. O. (2020). Treatment of depression in individuals with autism spectrum disorder: A systematic review. *Research in Autism Spectrum Disorders*, 78, 101639.

Milton, D. E. (2012). On the ontological status of autism: The 'double empathy problem'. *Disability & Society*, 27(6), 883–887.

Mitchell, P., Sheppard, E., & Cassidy, S. (2021). Autism and the double empathy problem: Implications for development and mental health. *British Journal of Developmental Psychology*, 39(1), 1–18.

Morgan, D. L. (2014). Pragmatism as a paradigm for social research. *Qualitative Inquiry*, 20(8), 1045–1053.

Munesue, T., Nakamura, H., Kikuchi, M., Miura, Y., Takeuchi, N., Anme, T., Nanba, E., Adachi, K., Tsubouchi, K., Sai, Y., Miyamoto, K., Horike, S., Yokoyama, S., Nakatani, H., Niida, Y., Kosaka, H., Minabe, Y., & Higashida, H. (2016). Oxytocin for male subjects with autism spectrum disorder and comorbid intellectual disabilities: A randomized pilot study. *Frontiers in Psychiatry*, 7(2), 1–11.

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, 16(1), 1609406917733847.

Rao, S. M., & Gagie, B. (2006). Learning through seeing and doing: Visual supports for children with autism. *Teaching Exceptional Children*, 38(6), 26–33.

Sasson, N. J., Faso, D. J., Nugent, J., Lovell, S., Kennedy, D. P., & Grossman, R. B. (2017). Neurotypical peers are less willing to interact with those with autism based on thin slice judgments. *Scientific Reports*, 7(1), 1–10.

Savaya, R., & Waysman, M. (2005). The logic model: A tool for incorporating theory in development and evaluation of programs. *Administration in Social Work*, 29(2), 85–103.

Scattone, D., & Mong, M. (2013). Cognitive behavior therapy in the treatment of anxiety for adolescents and adults with autism spectrum disorders. *Psychology in the Schools*, 50(9), 923–935.

Schiltz, H. K., McVey, A. J., Dolan, B. K., Willar, K. S., Pleiss, S., Karst, J. S., Carson, A. M., Caiozzo, C., Vogt, E. M., Yund, B. D., & Van Hecke, A. V. (2018). Changes in depressive symptoms among adolescents with ASD completing the PEERS® social skills intervention. *Journal of Autism and Developmental Disorders*, 48, 834–843.

Shahnavaz, S., Rutley, S., Larsson, K., & Dahllöf, G. (2015). Children and parents' experiences of cognitive behavioral therapy for dental anxiety–A qualitative study. *International Journal of Paediatric Dentistry*, 25(5), 317–326.

Shattuck, P. T., Seltzer, M. M., Greenberg, J. S., Orsmond, G. I., Bolt, D., Kring, S., Lounds, J., & Lord, C. (2007). Change in autism symptoms and maladaptive behaviors in adolescents and adults with an autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 37(9), 1735–1747.

Sheppard, E., Pillai, D., Wong, G. T. L., Ropar, D., & Mitchell, P. (2016). How easy is it to read the minds of people with autism spectrum disorder? *Journal of Autism and Developmental Disorders*, 46(4), 1247–1254.

Spain, D., & Blainey, S. H. (2015). Group social skills interventions for adults with high-functioning autism spectrum disorders: A systematic review. *Autism*, 19(7), 874–886.

Spain, D., Sin, J., Harwood, L., Mendez, M. A., & Happé, F. (2017). Cognitive behaviour therapy for social anxiety in autism spectrum disorder: A systematic review. *Advances in Autism*, 3, 34–46.

Stawarz, K., Preist, C., Tallon, D., Wiles, N., & Coyle, D. (2018). User experience of cognitive behavioral therapy apps for depression: An analysis of app functionality and user reviews. *Journal of Medical Internet Research*, 20(6), e10120.

Tantum, D. (2014). Adults with ASD. *Current Developmental Disorders Reports*, 1(1), 1–7.

Tobin, M. C., Drager, K. D., & Richardson, L. F. (2014). A systematic review of social participation for adults with autism spectrum disorders: Support, social functioning, and quality of life. *Research in Autism Spectrum Disorders*, 8(3), 214–229.

Trevisan, D. A., Tafreshi, D., Slaney, K. L., Yager, J., & Iarocci, G. (2018). A psychometric evaluation of the multidimensional social competence scale (MSCS) for young adults. *PLoS One*, 13(11), e0206800.

Wehman, P., Schall, C., Carr, S., Targett, P., West, M., & Cifu, G. (2014). Transition from school to adulthood for youth with autism spectrum disorder: What we know and what we need to know. *Journal of Disability Policy Studies*, 25(1), 30–40.

Weston, L., Hodgekins, J., & Langdon, P. E. (2016). Effectiveness of cognitive behavioural therapy with people who have autistic spectrum disorders: A systematic review and meta-analysis. *Clinical Psychology Review*, 49, 41–54.

White, S. W., Koenig, K., & Scahill, L. (2010). Group social skills instruction for adolescents with high-functioning autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities*, 25(4), 209–219.

White, S. W., Mazefsky, C. A., Dichter, G. S., Chiu, P. H., Richey, J. A., & Ollendick, T. H. (2014). Social-cognitive, physiological, and neural mechanisms underlying emotion regulation impairments: Understanding anxiety in autism spectrum disorder. *International Journal of Developmental Neuroscience*, 39, 22–36.

White, S. W., Ollendick, T., Albano, A. M., Oswald, D., Johnson, C., Southam-Gerow, M. A., Kim, I., & Scahill, L. (2013). Randomized controlled trial: Multimodal anxiety and social skill intervention for adolescents with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 43, 382–394.

Williams, C. J. (2001). *Overcoming depression: A five areas approach*. Arnold.

Woodbury-Smith, M. R., Robinson, J., Wheelwright, S., & Baron-Cohen, S. (2005). Screening adults for Asperger syndrome using the AQ: A preliminary study of its diagnostic validity in clinical practice. *Journal of Autism and Developmental Disorders*, 35, 331–335.

Woodman, A. C., Smith, L. E., Greenberg, J. S., & Mailick, M. R. (2015). Change in autism symptoms and maladaptive behaviors in adolescence and adulthood: The role of positive family processes. *Journal of Autism and Developmental Disorders*, 45, 111–126.

Yager, J., & Iarocci, G. (2013). The development of the multidimensional social competence scale: A standardized measure of social competence in autism spectrum disorders. *Autism Research*, 6(6), 631–641.

Zahra, D., & Hedge, C. (2010). The reliable change index: Why isn't it more popular in academic psychology. *Psychology Postgraduate Affairs Group Quarterly*, 76(76), 14–19.

AUTHOR BIOGRAPHIES

Dr David Tate is a chartered psychologist and a qualified therapeutic counsellor. David has expertise in the field of mental health and neurodevelopmental disorders. David has his MSc in Applied Psychology (therapies), PhD in the field of behavioural medicine, a Postgraduate Certificate in Academic Practice (PGCAP) and is a Fellowship of the Higher Education Academy (FHEA). Part of his role at the University of Salford requires David to deliver expert lectures across the psychology programme and supervise research projects. In his researcher role, David regularly works as part of a team of researchers and clinicians developing new psychological interventions.

Dr Linda Dubrow-Marshall is a clinical and counselling psychologist (HCPC-registered) and a BACP-accredited counsellor/psychotherapist. Linda is a lecturer in applied psychology (therapies) and teaches at both the undergraduate and postgraduate levels. Previously, Linda designed and managed the new counselling and well-being service at the University of Salford and taught for the MSc in Counselling (professional training). Linda is an integrative psychotherapist and incorporates hypnotherapy and EMDR into practice. Linda has extensive clinical and counselling experience in a variety of settings, including universities, prisons, addiction agencies, psychiatric hospitals, veteran agencies and private practice. Linda obtained a PhD in Counselling Psychology from the University of Pennsylvania, USA, and did her PhD dissertation on 'Marital relationships of children of Holocaust survivors'. Linda is currently studying for the PGCAP.

Dr Clare S. Allely is a professor in forensic psychology at the University of Salford in Manchester, England, and is an affiliate member of the Gillberg Neuropsychiatry Centre at Gothenburg University, Sweden. Clare holds a PhD in Psychology from the University of Manchester and has previously graduated with an MA (Hons.) in Psychology from the University of Glasgow, an MRes in Psychological Research Methods from the University of Strathclyde and an MSc in Forensic Psychology from Glasgow Caledonian University. Clare is also an honorary research fellow in the College of Medical, Veterinary and Life Sciences, affiliated to the School of Helath and Society at the University of Glasgow. She is also an associate of the Centre for Youth and Criminal Justice (CYCJ) at the University of Strathclyde. Clare acts as an expert witness in criminal cases and HCPC fitness to practise cases and also contributes to the evidence base used in the courts on psychology and legal issues through her published work.