

Group social skills interventions for adults with high-functioning autism spectrum disorders: A systematic review

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Abstract

Autism spectrum disorders are characterised by impairments in communication and social interaction. Social skills interventions have been found to ameliorate socio-communication deficits in children and adolescents with autism spectrum disorders. Little is known about the effectiveness of social skills interventions for adults with high-functioning autism spectrum disorders (hf-ASD) – a clinical population who can present with more subtle core deficits, but comparable levels of impairment and secondary difficulties. A systematic review was undertaken to investigate the effectiveness of social skills interventions for adults with high-functioning autism spectrum disorders. Five studies met the pre-specified review inclusion criteria: two quasi-experimental comparative trials and three single-arm interventions. There was a degree of variation in the structure, duration and content of the social skills interventions delivered, as well as several methodological limitations associated with included studies. Nevertheless, narrative analysis tentatively indicates that group social skills interventions may be effective for enhancing social knowledge and understanding, improving social functioning, reducing loneliness and potentially alleviating co-morbid psychiatric symptoms.

Keywords

adults, Asperger's syndrome, autism spectrum, group therapy, interventions, social skills

Introduction

Autism spectrum disorders (ASD) are relatively common lifelong neurodevelopmental conditions, affecting approximately 1% of the population (Brugha et al., 2011). ASD are characterised by qualitative impairments in communication, social interaction and relatedness, and engagement in restricted and repetitive behaviours (World Health Organization (WHO), 1992). There is significant heterogeneity in the ASD symptom profile. For some individuals, core characteristics are profound, severe and accompanied by an intellectual disability (ID), leading to childhood diagnosis. For others, symptoms are more subtle or 'masked' and compensated for; hence, diagnosis is made during late adolescence or adulthood (National Institute for Health and Care Excellence (NICE), 2012).

Across the spectrum, ASD is associated with substantial impairment in multiple domains of functioning: educational outcomes are often poor, employment rates are low and self-sufficiency skills can be impeded (Gray et al., 2014; Mavranzouli et al., 2014; NICE, 2012). Interpersonal functioning is also typically affected. Despite the

desire for social relationships, individuals with ASD often experience bullying and victimisation (Schroeder et al., 2014), rejection and poor peer relationships, all of which may exacerbate social isolation and loneliness (White and Roberson-Nay, 2009).

Rates of co-morbid mental health conditions, such as anxiety disorders and depression, also exceed those reported for typically developing (i.e. non-ASD) and other clinical populations (Hofvander et al., 2009; Joshi et al., 2013; Simonoff et al., 2008). These co-occurring difficulties compound impairments in functioning, reduce propensity for independent living and hamper education and employment prospects.

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There is no cure for ASD *per se*, but there has been increasing focus on the development of psychosocial interventions to ameliorate difficulties in day-to-day functioning arising from core characteristics. Social skills interventions (SSI) – delivered individually or in groups – have been researched more extensively than most other psychosocial interventions (Reichow et al., 2012), and their use is supported by UK Clinical Guidelines (NICE, 2012, 2014). While there are noted differences between the methodologies, modalities, structure and content of empirically evaluated SSI (Kaat and Lecavalier, 2014), the main aims are shared. These are primarily (a) to improve core socio-communication impairments (e.g. verbal and non-verbal social skills augmentation), (b) to increase quality and quantity of peer relationships (e.g. develop assertiveness skills and reduce loneliness), (c) to enhance emotion recognition and regulation (e.g. understanding own and others' emotional reactions), (d) to develop problem-solving strategies and/or (e) to address secondary difficulties that can arise from core ASD characteristics (e.g. impact on others, or co-occurring behavioural or mental health symptoms).

SSI have included purely behavioural strategies (Nuernberger et al., 2013), and new technologies such as virtual reality to teach individuals skills in a structured manner (Kandalaf et al., 2013; Mitchell et al., 2007). However, given the inherent neuropsychological impairments individuals with ASD can experience (such as difficulties with cognitive flexibility and generalisation of skills (Brunsdon and Happé, 2014; Wilson et al., 2014)), the applicability of individual training sessions to real-world situations (e.g. complex social, educational or work-based contexts) is questionable. Some SSI involve parents taking on a co-therapist (adjunctive) role in order to reinforce and support skills acquisition (e.g. Laugeson and Frankel, 2011). Such interventions may, however, be less appropriate or feasible for higher functioning individuals with ASD. Given these difficulties with individual interventions, it seems that a group-based format holds several advantages over individual interventions. Group-based SSI, for example, are more likely to facilitate opportunities for peer support, normalising of problematic experiences, stigma reduction and shared problem-solving. It is also plausible that group SSI have more ecological validity than individual approaches, enabling more realistic practice opportunities with peers, as well as occasions to reduce isolation and increase positive social experiences.

While several studies have investigated the effectiveness of group SSI, they have primarily included children and adolescents with ASD (Cappadocia and Weiss, 2011; Reichow et al., 2012). Study findings, overall, have demonstrated improvement in social competence and friendship quality; however, group SSI have limited impact on the enhancement of emotion recognition skills. However, there are several methodological limitations which may have affected internal and external study validity, including

small samples, participant heterogeneity (e.g. in core and co-morbid disorders, and intellectual and neuropsychological functioning), variability in outcome measurement methods and lack of blinding of outcome assessors (Kaat and Lecavalier, 2014).

Relatively little is known about the potential effectiveness and acceptability of group-based SSI for adults with high-functioning ASD (hf-ASD). Those with hf-ASD do not meet ID criteria (i.e. they have an IQ within the normal range) and meet ASD criteria. This clinical population can present with relatively subtle core symptoms; however, the ensuing impairment and distress they experience is comparable to those with more severe characteristics, yet conceivably underestimated by others. Also, adults with hf-ASD may have different support structures in place, compared with children and adolescents, or adults with ID; for example, they may be more likely to live alone, or require help with managing workplace social interactions. Research has often tended to focus on the needs of children, or adults with ID, but the likely differing needs and support structures of adults with hf-ASD suggest that research in other populations may not be easily extrapolated. Therefore, this article will concentrate on the needs of this particular group. As the needs of adults with ASD become more widely recognised (Autism Act, 2009; NICE, 2012), it is important to understand which interventions might be useful for reducing core socio-communication deficits, and to identify how best they can be delivered to optimise outcomes. This systematic review aimed to synthesise information about the effectiveness of group SSI delivered specifically to adults with hf-ASD, and to outline implications for clinical practice.

Method

Search strategy

A systematic search of published studies was undertaken in the following databases: MEDLINE, PsycINFO and Embase, from inception until 29 April 2014. A supplementary search was undertaken in the Cochrane Central Register of Controlled Trials (CENTRAL). A combination of search terms was used, including *autis* – Asperger* – pervasive development* disorder* AND social skills training – social interaction training – social cognition*. Types of comparator interventions and outcomes were not stipulated in order to maximise the scope of the search.

Study inclusion and exclusion criteria

Pre-determined criteria were (a) primary empirical studies; (b) published in peer-reviewed English-language publications; (c) that specifically sought to investigate the effectiveness of group-based clinician-facilitated SSI of any duration or frequency; (d) for individuals aged 18 years

and over, diagnosed with ASD (including high-functioning autism, Asperger's syndrome, atypical autism or pervasive developmental disorders); and (e) that employed at least one self-, informant- or clinician-rated outcome measure of social skills or associated symptoms. Studies that included children or adults with ASD and ID were excluded, as were studies describing interventions containing SSI components but that had an alternative primary remit, for example, cognitive behaviour therapy (CBT).

Data extraction

A data extraction form was developed to summarise information about the study design and setting, population characteristics, interventions delivered (number of sessions, frequency, duration, content and techniques used), outcome measurements, results, attrition and treatment fidelity.

Analysis plan

Methodological and clinical heterogeneity between studies meant it was not possible to undertake a meta-analysis. A narrative approach was therefore employed.

Results

The database searches and study selection were undertaken by both authors (see Figure 1). The search initially yielded 1369 papers. Duplicates were excluded, leaving 1094 papers. Of these, 1078 were excluded following review of the title or abstract as they were irrelevant. In total, 16 papers were retrieved for full text review and examined independently by both authors. Based on joint consensus, 11 studies were subsequently excluded because they did not meet the inclusion criteria: 4 did not report group interventions, 1 focused on an ID population, 2 were not published in a peer-reviewed journal, and 4 did not describe an empirical study (these were reviews or theoretical papers).

Overview of studies

Five studies were included (see Table 1 for an overview): one was a quasi-randomised controlled trial (RCT) comparing group SSI to a wait list control group (the PEERS programme; Gantman et al., 2012), and one was a quasi-experimental study comparing group SSI to treatment as usual (TAU) (Social Cognition and Interaction Training in Autism (SCIT-A); Turner-Brown et al., 2008). The remainder were single-arm interventions (the Aspirations Programme; Hillier et al., 2007, 2011; Howlin and Yates, 1999). Four studies used manualised group SSI (Gantman et al., 2012; Hillier et al., 2007, 2011; Turner-Brown et al., 2008). Studies were US or UK based and undertaken in

community settings. A combined total of 100 participants – recruited through local health services or community organisations – took part, with study sample sizes ranging from 10 to 49 participants.

Quality assessment

Study quality was considered independently by each author. No studies fully employed RCT conditions, and therefore, formal quality checklists were not used. All the included studies comprised relatively small samples. Only two compared the intervention to a control (Gantman et al., 2012; Turner-Brown et al., 2008), and perhaps all are best considered pilot studies.

Participant characteristics

Full demographic details are outlined in Table 2. The majority (85%) of study participants were male. Most participants were young adults, with a combined mean age of 25.8 years (overall range 18–55 years). Mean ages differed between groups in one study (Turner-Brown et al., 2008): participants receiving the intervention (SCIT-A) were much older on average (mean age 42.5 years) than participants in the TAU group (mean age 28.8 years).

All studies reported IQ scores; all participants fell within the average range, where scores were available. All studies required participants to have an ASD diagnosis, made by an appropriately qualified professional. No formal clinician-administered measures were used to establish the presence (or absence) of co-morbid mental health conditions.

Interventions

Studies differed somewhat with respect to their remit, structure and content. It is important to note that two studies charged participants (Hillier et al., 2007, 2011), although scholarships were reportedly available for those who could not afford to pay.

Structure. All groups – each comprising between 6 and 10 participants – met regularly (usually weekly, however one group met monthly; Howlin and Yates, 1999), for between 8 and 18 sessions, which lasted 50 min to 2.5 h. One group held monthly reunions following completion of the group (Hillier et al., 2007, 2011). At least two members of staff facilitated each group, where numbers are reported (Gantman et al., 2012; Hillier et al., 2007, 2011).

Carer input. Two studies included adjunctive caregivers group. One of these ran alongside the participant group, was researcher-facilitated and aimed to promote caregiver support for (participant) skill development (Gantman et al., 2012). Another was a self-directed support group

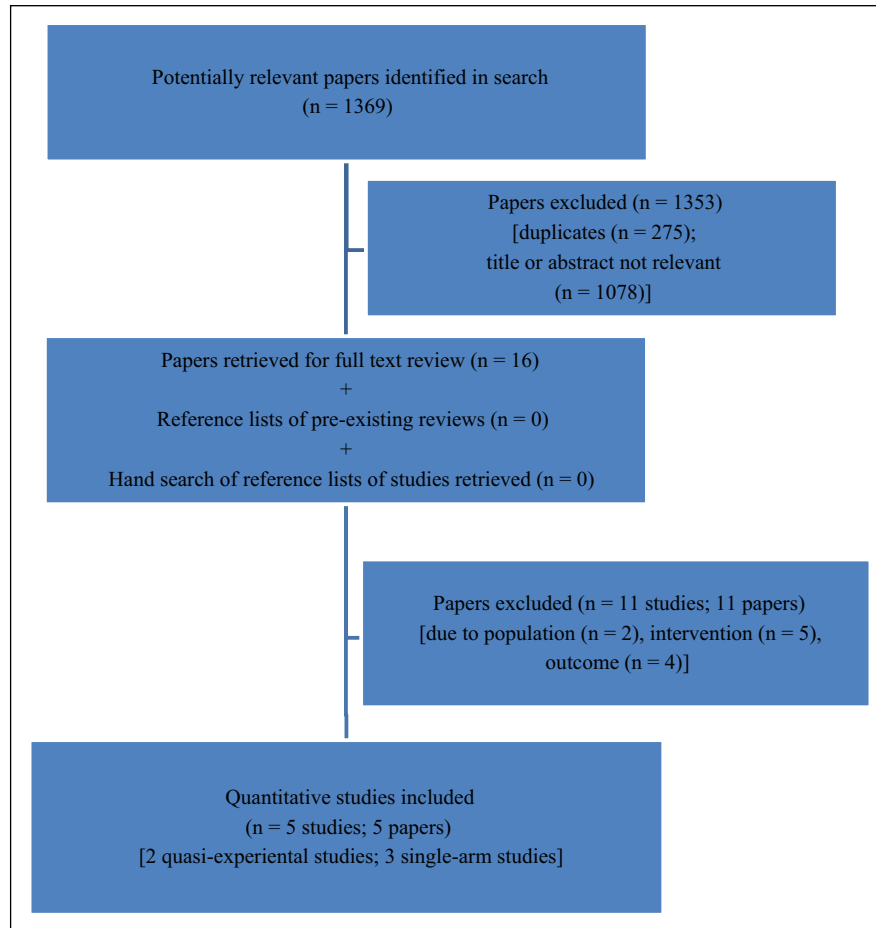


Figure 1. Systematic search results.

which parents were encouraged to attend (Hillier et al., 2007).

Content. Session content varied between groups both in terms of the amount and depth of topics included. The approach of one study (Turner-Brown et al., 2008) differed somewhat from the rest and focused on the underlying deficits impacting on social interaction. Three main areas were covered: emotional understanding, understanding situations and integration of these skills into daily social situations. Of the four remaining studies, all covered specific social topics, and broadly included information on friendships, understanding social interactions and problem-solving of challenging social situations. However, within this framework, there were differences in focus. The Aspirations groups (Hillier et al., 2007, 2011), for example, overtly focused on vocational skills as well as social skills, and as such included a session on employment, as did one other group (Howlin and Yates, 1999). The PEERS group (Gantman et al., 2012) focused specifically on building social relationships and included more content on conversational skills, electronic communication, humour, developing friendship networks, dating and

coping with difficult situations such as negative feedback, peer pressure and arguments. Howlin and Yates (1999) developed their group in conjunction with their participants: topics included emotional recognition, assertiveness and general problem-solving. This was the only non-manualised group included.

Methods. All studies incorporated several approaches to the material covered: didactic teaching, small and larger group discussions, practical tasks, for example, role plays (Gantman et al., 2012; Howlin and Yates, 1999), or tasks relevant to that day's topic, for example, evaluating videos for social cues (Turner-Brown et al., 2008). Hillier et al. (2007, 2011) incorporated prescribed social events as specific sessions. One group (Gantman et al., 2012) primarily utilised a didactic approach, which involved introducing social rules in a Socratic format and encouraging participants to develop their own solutions. Three groups utilised a supportive group model (Hillier et al., 2007, 2011; Howlin and Yates, 1999). Between-session learning was strongly encouraged by two studies, whereby group participants were set 'homework' tasks (Gantman et al., 2012; Turner-Brown et al., 2008). The monthly reunions following one group (Hillier

Table 1. Overview of studies.

| Study and setting | Method | Intervention | Outcome measures | Results |
|-----------------------|--|--|--|--|
| Gantman et al. (2012) | Quasi-experimental | Number of sessions: 14 | Self-report: SELSA, QSQ, SSI, EQ, TYASSK | Differences between groups noted, pre- and post-treatment: self- and informant-rated improvement in knowledge of social rules, reduced loneliness and improved social responsiveness |
| US | Social skills (SS) (n = 9) vs wait list (WL) (n = 8) Caregivers had the option to attend a concurrent group | Frequency: weekly Duration: 90 min Session topics: Conversation skills, e-communication, developing friendships, appropriate humour, peer entry and exit strategies, managing teasing, feedback and peer rejection, avoiding exploitation, managing disagreements, dating skills | Informant-based: SRS, EQ, SSRS, QSQ | |
| Community-based | Manualised approach (adapted from PEERS programme) | Techniques: Didactic teaching, role play, rehearsal, feedback on performance, caregiver support Homework: weekly tasks – specific tasks not described Number of sessions: 8 | Clinician-administered: n/a | |
| Hillier et al. (2007) | Single-arm intervention | Frequency: weekly Duration: 60 min Session topics: introduction, employment, friendship, social event, general and interpersonal problem-solving, social communication and theory of mind, review Techniques: facilitated discussion, problem-solving approach, social event to practise skills, limited didactic techniques Homework: specific tasks not described Number of sessions: 8 | Self-report: AQ-modified, EQ-modified, IPR, informal feedback | No significant differences between pre- and post-treatment self-report measures |
| US | Non-randomised design Data pooled from two groups | | Informant-based: informal feedback | Improvements noted on behavioural observation and clinical notes review |
| Community-based | Manualised approach (Aspirations programme) | Parents had the option to attend a concurrent group | Clinician-administered: behavioural observation of frequency and type of comments made | |
| Hillier et al. (2011) | Single-arm intervention | Frequency: weekly | Self-report: BDI, STAI, IPR | Self-reported improvements in anxiety and depression scores |
| US | Non-randomised design | | | |

(Continued)

Table 1. (Continued)

| Study and setting | Method | Intervention | Outcome measures | Results |
|----------------------------------|---|--|--|---|
| Community-based | Data pooled from nine groups Manualised approach (Aspirations programme) | <i>Duration:</i> 60 min <i>Session topics:</i> introduction, social communication, relationships, social event, independent living, independence and college, employment, review <i>Techniques:</i> facilitated discussion, problem-solving approach, social event to practise skills, limited didactic techniques <i>Homework:</i> specific tasks not described <i>Number of sessions:</i> 12 | <i>Informant-based:</i> informal feedback <i>Clinician-administered:</i> n/a | Non-statistically significant improvements in attitudes and feelings towards peers |
| Howlin and Yates (1999) UK | Single-arm intervention | <i>Frequency:</i> monthly <i>Duration:</i> 2.5 h <i>Session topics:</i> psycho-education; emotion recognition and regulation strategies; conversation skills; verbal and non-verbal communication; initiating, maintaining and ending interactions; assertiveness; problem-solving; skills for job interviews; managing stress <i>Techniques:</i> problem-solving, role play, team work, structured games, video-feedback, repetition and consolidation of session topics <i>Homework:</i> not reported <i>Number of sessions:</i> 18 | <i>Self-report:</i> Checklist <i>Informant-based:</i> Checklist <i>Clinician-administered:</i> video-recordings of role-play scenarios to measure changes in content, style and amount of conversation | Improvements in quality and style of conversation post-treatment Self- and informant-reported improvements post-intervention in communication, relatedness, and emotional awareness |
| Turner-Brown et al. (2008) US | Quasi-experimental Social skills (SS) (n = 6) vs. treatment as usual (TAU) (n = 5) | <i>Frequency:</i> weekly | <i>Self-report:</i> FEIT <i>Hinting Task:</i> SSCQ | Improvements in emotion recognition for the SS group Enhanced performance on theory of mind tasks post the active intervention No significant differences between groups in social functioning post-treatment |
| Community-based | Manualised approach (Social Cognition and Interaction Training – adapted for ASD; SCIT-A) | <i>Duration:</i> 50 min <i>Session topics:</i> Three main themes – introduction and emotions (emotion recognition and training); understanding situations (cognitive strategies to distinguish between facts from assumptions and guesses); and checking it out (testing out predictions) <i>Techniques:</i> psycho-education, discussion, behavioural experimentation, role plays, use of video examples, consolidation of techniques <i>Homework:</i> not reported | <i>Informant-based:</i> n/a <i>Clinician-administered:</i> SSPA | |

ADOS: Autism Diagnostic Observation Schedule; FEIT: face emotion recognition test; SSCQ: Social Skills Communication Questionnaire; SSPA: standardised role play; BDI: Beck Depression Inventory; STAI: Spielberger Trait Anxiety Inventory; IPR: Index of Peer Relations; AQ: autism (Spectrum) quotient (Baron-Cohen et al., 2001); EQ: empathy quotient; SELSA: Social and Emotional Loneliness Scale for Adults; QSQ: Quality of Socialisation Questionnaire; SSI: Social Skills Inventory; TYASSK: Test of Young Adult Social Skills Knowledge; SRS: Social Responsiveness Scale; SSRS: Social Skills Rating Scale; GADS: Gilliam Asperger Disorder Scale (Gilliam, 2001).

Table 2. Participant demographic information.

| Study | Gender | Age (years) | IQ | ASD diagnoses | Comorbidities | Social circumstances and occupation |
|----------------------------|---------------------|---|---|---|---|--|
| Gantman et al. (2012) | 12 males, 5 females | Mean age: 19.9 (SS) Mean age: 20.9 (WL) | KBIT: 97 (SS) Vineland: 70 (SS) KBIT: 109 (WL) Vineland: 65 (WL) | AS: 11 Autism: 4 PDD-NOS: 2 Existing clinical diagnosis; confirmed with AQ | Diagnoses of major mental disorders excluded; not formally assessed for the study | Living with family: n = 16 College: n = 17 |
| Hillier et al. (2007) | 11 males, 2 females | Mean age: 19 | Mean FIQ: 108 Mean VIQ: 113 Mean PIQ: 100 (WAIS) | AS: 8 Autism: 1 PDD-NOS: 4 Existing clinical diagnosis; confirmed with GADS | Not reported | Social circumstances not reported Current work: n = 3 Previous work: n = 6 |
| Hillier et al. (2011) | 42 males, 7 females | Mean age: 21 | Mean FIQ: 99 (n = 28) | AS: 42 Autism: 6 PDD-NOS: 1 Existing clinical diagnosis; not formally assessed for the study | 'Challenging behaviour' was an exclusionary criteria; not formally assessed for the study | Neither reported |
| Howlin and Yates (1999) | 10 males | Mean age: 28.4 | Mean PIQ: 109 | AS or Autism: 10 Existing clinical diagnosis; not formally assessed for the study | Not reported | Changed during SSI |
| Turner-Brown et al. (2008) | 10 males, 1 female | Mean age: 42.5 (SCIT) Mean age: 28.8 (TAU) | Mean FIQ: 113 (SCIT) Mean FIQ: 111 (TAU) | Autism: 8 ASD: 3 Existing clinical diagnosis; confirmed with the ADOS | Not reported | Not reported |

IQ: intelligence quotient; VIQ: verbal IQ; PIQ: performance IQ; FIQ: full-scale IQ; AS: Asperger Syndrome; PDD-NOS: Pervasive Developmental Disorder-Not Otherwise Specified; AQ: Autism Quotient; GADS: Gilliam Asperger's Disorder Scale; KBIT: Kaufman Brief Intelligence Test; WAIS: Wechsler Adult Intelligence Scale; ADOS: Autism Diagnostic Observation Schedule (Lord et al., 2000); TAU: Treatment As Usual; SCIT: Social Cognition and Interaction Training.

et al., 2007) were intended to enhance skill development and maintenance following group completion.

Outcome measurement

Participants across studies completed measures pre- and post-intervention, although the precise timings of assessments varied, and were not reported by Hillier et al. (2007) and Turner-Brown et al. (2008). No studies collected baseline or follow-up data. Outcome data were unavailable for some participants, due to refusal to complete measures, 'poor motivation', addition of extra measures during the intervention (Hillier et al., 2011), or attrition (Turner-Brown et al., 2008).

Both quality and quantity of various facets of social skills (e.g. understanding, practical application of skills, satisfaction levels) and associated characteristics were assessed. Some studies evaluated the impact of the intervention on social cognition and understanding, that is, the core deficits of ASD (Hillier et al., 2007; Turner-Brown et al., 2008). Several studies assessed social functioning (Gantman et al., 2012; Howlin and Yates, 1999), friendship satisfaction (Hillier et al., 2007, 2011) and quality of other relationships, for example, social and emotional loneliness (Gantman et al., 2012). These were measured using self- and other-rated measures, alongside objective measures made within the groups. Hillier et al. (2011) primarily investigated the effect of the group on self-reported anxiety and depression levels and also measured attitudes and feelings towards peers (Index of Peer Relations (IPR); Hudson, 1992). Two studies sought feedback about intervention acceptability as part of their post-group outcome measurement battery, using informal (Hillier et al., 2007) or formal means (Turner-Brown et al., 2008).

Study results

Overall, study findings were positive, although reliability and validity of some of the reported results appears questionable at points. Effect sizes were provided for two studies (Hillier et al., 2011; Turner-Brown et al., 2008); the clinical significance of change scores for outcome measures was not described in any study. Study results have been grouped into four themes: social knowledge and cognition, social functioning, anxiety and depression, and satisfaction with the intervention.

Social knowledge and cognition. Social knowledge was assessed in one study (Gantman et al., 2012). Participants demonstrated significantly improved social knowledge as rated by self-report following the group, compared to controls.

Social cognition skills were measured in a number of domains. Significant differences were seen in empathy scores (measured using the empathy quotient (EQ); Baron-Cohen and Wheelwright, 2004) following the PEERS

group intervention (Gantman et al., 2012). Similarly, empathy scores were significantly improved following the Aspirations group (Hillier et al., 2007). It is noteworthy that neither study provides overall mean scores, and so it is unclear whether these represent a clinically relevant change or a more general trend. The SCIT-A intervention was specifically targeted at improving social cognition. Participants in the treatment group performed significantly better on a task of facial emotion recognition than controls following the intervention, with an effect size of 0.94 (Turner-Brown et al., 2008). It was also found that participants performed better on a Theory of Mind task following the intervention, as compared to the control group. Again the effect size was large (Cohen's $d=0.84$) suggesting a significant treatment effect. While the sample sizes are fairly small, these results suggest that the group SSI led to general improvement in social knowledge and cognition, particularly in relation to empathy, emotion recognition and Theory of Mind.

Social functioning. Improved social knowledge and cognition are arguably only relevant if participants are able to translate these improvements to real-life situations. Social functioning was assessed via self- and other ratings, performance on role-play tasks and social functioning outside of the group setting. Significant changes were seen on self-report measures of loneliness (Gantman et al., 2012), improved attitudes towards peers (Hillier et al., 2007, 2011) and improved perceived social communication skills (Turner-Brown et al., 2008). Non-standardised assessments of social functioning were employed by Howlin and Yates (1999), including self-reports of communication skills, ability to relate to others and ease of interpreting others' emotions; the majority of participants (90%) self-reported improvement in these areas following the group.

More objective measures were used in some studies, including role plays (Howlin and Yates, 1999; Turner-Brown et al., 2008), observations in groups (Hillier et al., 2007) and parent- or carer-rated measures of social functioning (Gantman et al., 2012). The variability of objective measures utilised renders it difficult to compare outcomes across studies, as it would appear that, for example, performance in a simulated job interview is not directly comparable to frequency of social interactions.

One study demonstrated that participants made significantly more comments in the latter stages of the group than in the earlier stages, suggesting that the skills being learned may have been enabled members to participate more frequently (Hillier et al., 2007). Conversely, it may be that participants had become more habituated to the situation, that is, that they had become accustomed to being in a group context. However, staff notes from the sessions also appeared to reflect an increased recognition of, and respect for, the perspectives of others over the course of the group.

Role-play task performance varied between studies. On a standardised role-play assessment, in which participants

took part in three 3-min conversations on specific topics, there were no differences pre- and post-group (Turner-Brown et al., 2008), suggesting that the group had limited impact on social functioning. However, using role plays of social activities (a wedding party and enquiring about a job), Howlin and Yates (1999) showed that participants were able to provide more appropriate responses in both situations following the group. These results suggest that each group may have impacted differently on participants' abilities to perform in role played social situations. However, Turner-Brown et al. (2008) employed a task which focused on rating several aspects of social communication (interest, fluency, clarity, focus, affect, social appropriateness and conversation), whereas Howlin and Yates (1999) focused their role-play assessments on the types of utterances expressed. It may be, therefore, that the differences seen reflect the different approaches used in assessing social functioning.

Finally, some studies assessed social functioning outside of the groups. The PEERS group showed a significant increase in social get-togethers in the participant group, following the intervention, as compared to the controls, and rated by carers. Caregivers also rated participants as showing significantly improved social skills and social responsiveness following intervention, as compared to control group participants. Non-standardised questionnaires given to caregivers also suggested improvements in conversational and social skills following the group (Howlin and Yates, 1999).

While self-report measures utilised indicate that SSI groups encouraged improved social functioning, their validity is questionable, particularly given the known difficulties people with ASD have with insight and social skills. Informant-report measures are potentially more objective, but these were only completed in two studies, only one of which used a standardised measure. However, caregiver-ratings were suggestive of an improvement in social skills. The data from the role-play data suggested more equivocal findings: it may be that the type of measure used to rate social functioning impact on what changes, if any, are noted.

Anxiety and depression. The second Aspirations study (Hillier et al., 2011) was primarily focused on the impact of social skills groups on anxiety and depression. Following the group, participants reported significantly lower anxiety scores, although the effect size was small (Cohen's $d=0.21$) and the range of responses varied widely. The authors stated that 70% of participants endorsed reduced anxiety; however, the clinical significance levels are not provided for this measure. Similarly, 77% participants described significantly reduced depression scores, but again with a small effect size (Cohen's $d=0.24$) and a large range.

Treatment satisfaction. Acceptability of the group was assessed by Hillier et al. (2007) and Howlin and Yates

(1999). Feedback from participants in both groups suggested that the groups were acceptable to them and that they were able to put some of the skills learned into practice, indicating that participants feel positive about such groups.

Attrition

Four participants across two studies disengaged mid-intervention. Two participants (18% of the sample) did not complete follow-up measures in one study (Turner-Brown et al., 2008). Within this study, two participants also moved from the intervention to the control group. Two participants (10% of the sample) from the PEERS study (Gantman et al., 2012) dropped out following randomisation.

Treatment fidelity

Excluding the study by Howlin and Yates (1999), studies used a manualised approach. One study reported that treatment fidelity was assessed (Gantman et al., 2012); this was undertaken by research assistants who also participated in role-play exercises and provided coaching to group members during practice tasks. Further details about fidelity ratings were unavailable.

Discussion

This is the first systematic review, to our knowledge, to evaluate the effectiveness of group-based SSI specifically for adults with hf-ASD. Of 16 studies, 5 potentially relevant studies met pre-specified inclusion criteria: 3 studies described a single-arm intervention (Hillier et al., 2007, 2011; Howlin and Yates, 1999); 2 studies utilised quasi-experimental methods and included either a wait list control (Gantman et al., 2012) or TAU (Turner-Brown et al., 2008) comparison group. While the overarching aims and remit of the groups were to enhance social skills, there were clear differences in the structure, content and duration of SSI groups between the studies. Also, there were distinctions in the types of outcome measurements used: no single outcome measure was used across all the studies. Although it is therefore difficult to clearly indicate whether one group is more effective for any one outcome, overall, the study results provide preliminary support for the effectiveness of group-based SSI for adults with hf-ASD. Participants were reported to have obtained some improvements in (a) social knowledge and cognition; (b) some areas of social functioning, particularly reduced loneliness; and tentatively (c) in low mood and anxiety symptoms.

These findings are broadly consistent with those of two previous reviews of group-based SSI for young people with ASD (Cappadocia and Weiss, 2011; Reichow et al., 2012). Reichow et al. (2012) noted that the five studies meeting their inclusion criteria (which included participants aged 8–17 years) partially differed in their design,

structure and remit. They concluded that group SSI were associated with potential improvements in some social skills domains, such as communication, quality of reciprocity, and quality of friendships. However, primary and secondary outcome measures varied between studies, rendering it difficult to draw meaningful comparisons with a large pooled sample of participants. Similarly, Cappadocia and Weiss (2011) undertook a review of three types of group SSI for young people with ASD (aged 6–18 years): standard group SSI, versus cognitive-behaviourally informed SSI groups, versus standard SSI groups augmented with carer input. Their analyses suggested that each type of intervention was associated with some change post-intervention, but due to methodological limitations, for example, small sample sizes and heterogeneity, it was not possible to conclude whether one approach was overall, more effective.

Limitations

Our review has several limitations. First, we only included English-language publications due to resource constraints. Second, we adopted a reductionist approach: we excluded SSI delivered via individual sessions and other formats (e.g. virtual reality), and studies that described elements of SSI, for example, adaptive skills training (Palmen et al., 2012), or CBT interventions (Binnie and Blainey, 2013; Spain et al., 2015). While this was in order to maximise study homogeneity, an implication is that our review does not enable analyses of the potential mediating and moderating mechanisms which may be integral to all SSI. Third, we did not search trial registers or contact experts in the field, and so, we cannot rule out the possibility of publication bias (e.g. omitting unpublished studies).

Clinical implications

While a paucity of studies were included in the review, it is nonetheless pertinent to consider the potential implications for the use of SSI in routine clinical practice. Therefore, we have extrapolated considerations for the design, delivery and evaluation of SSI, based on the study results as well as the literature regarding psychosocial interventions for people with ASD.

First, it is important for clinicians to consider the aims and remit of group-based SSI, that is the intention to enhance social knowledge, to improve social skills, to reduce associated difficulties or a combination of these aims. Studies reviewed focused on numerous topics, for between 8 and 18 sessions, and most topics were covered in one session. Given that individuals with ASD can experience information processing impairments (Wilson et al., 2014), a pragmatic approach may be needed regarding how many topics can be realistically and meaningfully covered per session and throughout the group programme. Also, novel situations and group-contexts can prove

anxiety-provoking for individuals with ASD (e.g. NICE, 2012). Hence, several introductory sessions (including clarity about what will and will not happen) may enable participants to feel more at ease. Adopting the same structure per session – for example setting ‘an agenda’ with specific timings (Gaus, 2011) – may prove useful. Similarly, collaboration with potential participants about the group remit, if this is feasible (as in the study by Howlin and Yates, 1999), may encourage engagement.

Second, it is important to consider who the target audience receiving the group-based SSI is. For example, are the SSI being offered to people with specific social skills difficulties? Not all studies reviewed assessed participants in terms of their cognitive functioning or the range of social skills deficits they may have experienced. This is important as ASD is an extremely heterogeneous condition (WHO, 1992) and it seems unlikely that group members with widely varying skills and abilities would work well together or find a group equally effective. Therefore, it is likely to be useful to assess current functioning (including co-morbid difficulties and social functioning) as well as ASD diagnosis (and symptom severity) when recommending a SSI. Next, it is noted that the majority (85%) of participants in studies reviewed were male. It has, however, been hypothesised that men and women with ASD have differing clinical presentations (e.g. Lai et al., 2011, 2012), and hence, they may have unique (as well as overlapping) needs (e.g. Byers et al., 2013) from SSI groups. Discussions about personal or intimate relationships, and ‘dating’ (e.g. Gantman et al., 2012), may be best covered in sex-specific groups. Age requirements are another important consideration. Apart from one study (Turner-Brown et al., 2008) which included older participants in the experimental group, all participants were aged 18–30 years. This is a relatively young sample, and it is unclear that groups such as those reviewed would necessarily be attractive or relevant to older adults. Therefore, it would be wise for clinicians to consider the age range and relevance of included topics to the intended participants.

Third, it is important to consider the optimum size of the group, given that people with ASD may find large groups challenging. Study samples reviewed comprised 6–10 participants and two or more facilitators. While there is a need to balance resource pressures (e.g. staffing ratios and service constraints), it is likely that smaller groups, with consistent facilitators, would be better tolerated by individuals with ASD, for example, as they are less overwhelming, and afford more opportunities for facilitator input.

Fourth, studies reviewed included a range of techniques to deliver the SSI. Whether specific techniques encouraged improved knowledge, cognition or functioning was not established. Hence, it seems likely a combination of techniques is most pragmatic, including didactic approaches, psycho-educational materials, (group-based) problem-solving and frequent opportunities to practise skills (in situ and

between sessions), as is the case for other psychosocial interventions (e.g. Anderson and Morris, 2006; Attwood, 2004; Cappadocia and Weiss, 2011; Gaus, 2011). Also, we suggest that inclusion of cognitive techniques (e.g. identifying and challenging negative thoughts and beliefs about the self), and behavioural techniques (e.g. graded exposure), may indirectly enhance confidence and skills acquisition. Perhaps unsurprisingly, the most significant improvements reported were seen in social knowledge and understanding, rather than behavioural change. Whether this is attributable to participant characteristics (e.g. executive functioning deficits), group process factors (e.g. insufficient time to practise), or other factors is unclear. Nevertheless it is likely that facilitating frequent opportunities for practical skill application is important. Also, the provision of written or pictorial information, for example, outlining the session summary and 'homework tasks' may facilitate recall between sessions (Attwood, 2004).

Finally, it is important to consider how best to measure primary and secondary outcomes. There was variation in the types of outcome measures employed by the studies reviewed – including those completed by participants, carers or clinicians – most of which are not validated for the ASD population. Also, there are some considerations associated with outcome measurement in ASD (Lecavalier et al., 2014). Whether individuals with ASD are able to reliably self-report their symptoms is not wholly established, although recent studies have suggested adults may be able to do so in terms of mental health characteristics (e.g. Berthoz and Hill, 2005; Cadman et al., 2015). It may not be feasible to have carer-rated measures, particularly for older adults; and it is questionable whether use of situation-specific role plays (which can vicariously incur anxiety and stress) are an ideal method of rating improvement. Best practice would therefore suggest that use of several subjective as well as objective (clinician-administered) measures may prove most useful. Few of the studies included formally assessed satisfaction and acceptability of the groups (i.e. whether participants perceived the group remit, structure and process to meet their needs); it may be that assessing these factors, for example, session by session, or after each topic has been covered, may aid with the development of more targeted SSI.

Research implications

There are several avenues for future research. First, there is a clear need for larger scale more methodologically rigorous studies in order to (a) ascertain which components of group SSI are associated with improved outcomes and (b) determine which techniques, in particular, are most suitable for enhancing skills acquisition within and beyond the group context, and for reducing secondary effects of social skills impairments. Second, more research is needed to establish whether the content of SSI should vary depending

on participant characteristics such as sex, age, ethnicity or religion (e.g. due to cultural and religion-based differences in displays of pro-social behaviour). Third, few validated measures exist for assessing, quantitatively and qualitatively, social skills in adults with ASD. Further studies should establish normative thresholds on existing measures (e.g. those used with younger or other clinical populations), or develop and validate new measures. Finally, there are limited data about the long-term consequences of social skills impairments. For example, for the adult ASD population, are social skills abilities and deficits associated with global functioning. Cross-sectional and longitudinal studies investigating these factors may enhance the refinement of evidence-based interventions.

Conclusion

Impairments in communication, social skills and relatedness are hallmark characteristics of ASD. To date, five studies have investigated the effectiveness of group-based SSI to reduce social skill deficits in adults with hf-ASD. Study findings provide preliminary support for these interventions. Yet, overall, interventions were more effective for enhancing knowledge and understanding rather than increasing specific social skills. Studies included varied widely in terms of their aims and content, and there was significant variability in the assessment of outcomes. We suggest that further methodologically rigorous studies, using validated outcome measures, are needed to investigate the key components of group-based SSI, in order to improve social functioning beyond the group context.

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References

- Anderson S and Morris J (2006) Cognitive behaviour therapy for people with Asperger syndrome. *Behavioural and Cognitive Psychotherapy* 34(3): 293–303.
- Attwood T (2004) Cognitive behaviour therapy for children and adults with Asperger's syndrome. *Behaviour Change* 21(3): 147–161.
- Autism Act 2009 (UK).
- Baron-Cohen S and Wheelwright S (2004) The empathy quotient: an investigation of adults with Asperger syndrome or high functioning autism, and normal sex differences. *Journal of Autism and Developmental Disorders* 34: 163–175.
- Baron-Cohen S, Wheelwright S, Skinner R, et al. (2001) The autism-spectrum quotient (AQ). Evidence from Asperger syndrome/high-functioning autism, males and females, scientists and mathematicians. *Journal of Autism and Developmental Disorders* 31: 5–17.

- Berthoz S and Hill EL (2005) The validity of using self-reports to assess emotion regulation abilities in adults with autism spectrum disorder. *European Psychiatry* 20(3): 291–298.
- Binnie J and 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.
- Brugha TS, McManus S, Bankart J, et al. (2011) Epidemiology of autism spectrum disorders in adults in the community in England. *Archives of General Psychiatry* 68: 459–465.
- Brunsdon VE and Happé F (2014) Exploring the ‘fractionation’ of autism at the cognitive level. *Autism* 18(1): 17–30.
- Byers ES, Nichols S and Voyer SD (2013) Challenging stereotypes: sexual functioning of single adult with high functioning autism spectrum disorder. *Journal of Autism and Developmental Disorders* 43: 2617–2627.
- Cadman T, Spain D, Johnston P, et al. (2015) Obsessive-compulsive disorder in adults with high-functioning autism spectrum disorder: what does self-report with the OCI-R tell us? *Autism Research*. Epub ahead of print 7 February. DOI: 10.1002/aur.1461.
- Cappadocia MC and Weiss JA (2011) Review of social skills training groups for youth with Asperger syndrome and high functioning autism. *Research in Autism Spectrum Disorders* 5(1): 70–78.
- Gantman A, Kapp SK, Orenski K, et al. (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(6): 1094–1103.
- Gaus V (2011) Cognitive behavioural therapy for adults with autism spectrum disorders. *Advances in Mental Health and Intellectual Disabilities* 5(5): 15–26.
- Gillam JE (2001) *Gillam Asperger’s Disorders Scale*. Austin, TX: PRO-ED.
- Gray KM, Keating CM, Taffe JR, et al. (2014) Adult outcomes in autism: community inclusion and living skills. *Journal of Autism and Developmental Disorders*. Epub ahead of print 11 June. DOI: 10.1007/s10803-014-2159-x.
- Hillier A, Fish T, Cloppert P, et al. (2007) Outcomes of a social and vocational skills support group for adolescents and young adults on the autism spectrum. *Focus on Autism and Other Developmental Disabilities* 22(2): 107–115.
- Hillier A, Fish T, Siegel JH, et al. (2011) Self-reported anxiety and depression among young adults on the autism spectrum. *Journal of Developmental and Physical Disabilities* 23(3): 267–276.
- Hofvander B, Delorme R, Chaste P, et al. (2009) Psychiatric and psychosocial problems in adults with normal-intelligence autism spectrum disorders. *BMC Psychiatry* 9: 35.
- Howlin P and Yates P (1999) The potential effectiveness of social skills groups for adults with autism. *Autism* 3(3): 299–307.
- Hudson JJ (1992) *The Index of Peer Relationships*. Tallahassee, FL: WALMYR.
- Joshi G, Wozniak J, Petty C, et al. (2013) Psychiatric comorbidity and functioning in a clinically referred population of adults with autism spectrum disorders: a comparative study. *Journal of Autism and Developmental Disorders* 43(6): 1314–1325.
- Kaat AJ and Lecavalier L (2014) Group-based social skills treatment: a methodological review. *Research in Autism Spectrum Disorders* 8: 15–24.
- Kandalaf MR, Didehbani N, Krawczyk DC, et al. (2013) Virtual reality social cognition training for young adults with high-functioning autism. *Journal of Autism and Developmental Disorders* 43(1): 34–44.
- Lai MC, Lombardo MV, Pasco G, et al. (2011) A behavioural comparison of male and female adults with high functioning autism spectrum conditions. *PLoS ONE* 6(6): e20835.
- Lai MC, Lombardo MV, Ruigrok AN, et al. (2012) Cognition in males and females with autism: similarities and differences. *PLoS ONE* 7(10): e47198.
- Laugeson EA and Frankel F (2011) *Social Skills for Teenagers with Developmental and Autism Spectrum Disorders: The PEERS Treatment Manual*. New York: Routledge.
- Lecavalier L, Wood JJ, Halladay AK, et al. (2014) Measuring anxiety as a treatment endpoint in youth with autism spectrum disorder. *Journal of Autism and Developmental Disorders* 44: 1128–1143.
- Lord C, Risi S, Lambrecht L, et al. (2000) The autism diagnostic observation schedule-generic: a standard measure of social and communication deficits associated with the spectrum of autism. *Journal of Autism and Developmental Disorders* 30(3): 205–223.
- Mavranouzouli I, Megnin-Viggars O, Cheema N, et al. (2014) The cost effectiveness of supported employment for adults with autism in the UK. *Autism*. Epub ahead of print 29 April. DOI: 10.1177/1362361313505720.
- Mitchell P, Parsons S and Leonard A (2007) Using virtual environments for teaching social understanding to 6 adolescents with autistic spectrum disorders. *Journal of Autism and Developmental Disorders* 37(3): 589–600.
- National Institute for Health and Care Excellence (NICE) (2012) *Autism: Recognition, Referral, Diagnosis and Management of Adults on the Autism Spectrum*. London: Department of Health.
- National Institute for Health and Care Excellence (NICE) (2014) *Autism: Quality Standard 51*. London: Department of Health.
- Nuernberger JE, Gingdahl JE, Vargo KK, et al. (2013) Using a behavioural skills training package to teach conversation skills to young adults with autism spectrum disorders. *Research in Autism Spectrum Disorders* 7: 411–417.
- Palmen A, Didden R and Lang R (2012) A systematic review of behavioral intervention research on adaptive skill building in high-functioning young adults with autism spectrum disorder. *Research in Autism Spectrum Disorders* 6(2): 602–617.
- Reichow B, Steiner AM and Volkmar F (2012) Social skills groups for people aged 6 to 21 with autism spectrum disorders (ASD). *Cochrane Database of Systematic Reviews* (7): CD008511. DOI: 10.1002/14651858.CD008511.pub2.
- Schroeder JH, Cappadocia MC, Bebko JM, et al. (2014) Shedding light on a pervasive problem: a review of research on bullying experiences among children with autism spectrum disorders. *Journal of Autism and Developmental Disorders* 44(7): 1520–1534.
- Simonoff E, Pickles A, Charman T, et al. (2008) Psychiatric disorders in children with autism spectrum disorders: prevalence, comorbidity, and associated factors in a population-derived sample. *Journal of the American Academy of Child & Adolescent Psychiatry* 47(8): 921–929.

- Spain D, Sin J, Chalder T, et al. (2015) Cognitive behaviour therapy for adults with autism spectrum disorders and psychiatric co-morbidity: a review. *Research in Autism Spectrum Disorders* 9: 151–162.
- Turner-Brown LM, Perry TD, Dichter GS, et al. (2008) Brief report: feasibility of social cognition and interaction training for adults with high-functioning autism. *Journal of Autism and Developmental Disorders* 38(9): 1777–1784.
- White SW and Roberson-Nay R (2009) Autism, social deficits, and loneliness in youth with autism spectrum disorders. *Journal of Autism and Developmental Disorders* 39: 1006–1013.
- Wilson CE, Happé F, Wheelwright S, et al. (2014) The neuropsychology of male adults with high-functioning autism or Asperger syndrome. *Autism Research*. Epub ahead of print 5 June. DOI: 10.1002/aur.1394.
- World Health Organization (WHO) (1992) *ICD-10*. Geneva: WHO.