Department of Health Reviews Facility
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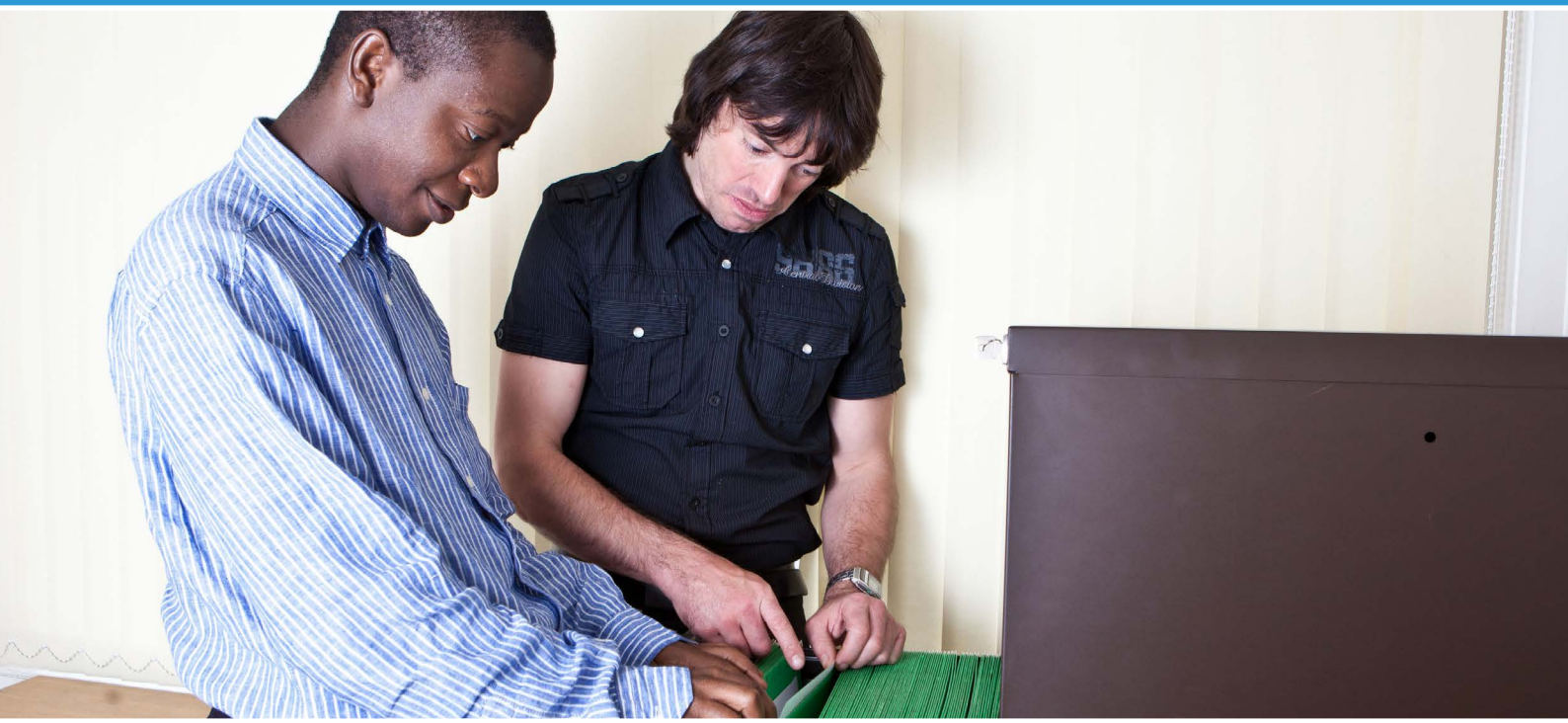
Preventative co-ordinated low-level support for adults with high-functioning autism

Systematic review and service mapping



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Abbreviations

AIF	Autism Innovation Fund
AIM	Advocacy, Information and Mentoring
BASS	Bristol Autism Spectrum Service
BME	black and minority ethnic
CAB	Citizens Advice Bureau
CBT	cognitive-behavioural therapy
CCG	Clinical Commissioning Group
CI	confidence interval
CPA	Care Plan Approach
DH	Department of Health
DWP	Department for Work and Pensions
FACS	Fair Access to Care Services
HFA	high-functioning autism
IAPT	Improving Access to Psychological Therapies
ICER	incremental cost-effectiveness ratio
IPR	Index of Peer Relations
IQ	intelligence quotient
LA	local authority
NAO	National Audit Office
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
nRCT	non-randomised controlled trial
OQ	Outcome Questionnaire
QA	quality assessment
QALY	quality-adjusted life-year
RCT	randomised controlled trial
SAE	Self-Assessment Exercise
SPSI	Social Problem Solving Inventory
SRS	Social Responsiveness Scale
SSRS	Social Skills Rating System
VR	virtual reality
1-G	one-group study

Executive summary

Background

People with autism spectrum disorders without learning disability ('high-functioning' autism or HFA), and their families, have a range of different needs, many of which could be addressed by personalised support. The Autism Strategy for England recommends that local authorities and other policy bodies take a pro-active approach to providing preventive 'low-level' support for adults with HFA. This may include practical assistance with daily life; social, emotional and vocational support; strengthening social networks, education or training; and facilitating access to services. However, we know little about the effectiveness or cost-effectiveness of these types of supportive interventions for people with HFA or the kinds of services currently available in England. We need to understand which supportive services have been rigorously evaluated, which are likely to be effective (and cost-effective), and how this evidence fits into the broader practice landscape. Therefore, we carried out:

i) a systematic review of the international research evidence on the effectiveness and cost-effectiveness of "low-level support services" for adults with HFA
ii) an overview of existing support services for adults with HFA in England

Systematic review: question and methods

What is known about the effectiveness, cost-effectiveness, and barriers and facilitators of low-level support services for adults with HFA?

We searched seven electronic databases, handsearched key journals and conducted web searches. Included studies were published in English and presented primary empirical data on a supportive intervention or service for adults with HFA. We defined 'supportive intervention' broadly, and only excluded interventions aiming to address a specific health condition. We included all outcomes (other than purely cognitive tests or task performance).

Study quality was assessed using design specific tools and data were extracted using a standardised form. Data were synthesised narratively by intervention type (forest plots presented where possible) and by outcome. We also grouped effectiveness studies according to whether or not they used a two-group (controlled) evaluation design. We sought to identify the numbers of study participants within each study and intervention grouping, as well as whether or not the findings for each outcome were statistically significant (with non-significant results reported below).

Systematic review: results

We identified 9,512 records. After screening, 37 full-text studies were included in the final synthesis: 27 effectiveness studies, three economic studies, and eight qualitative studies (one study reported both effectiveness and qualitative data).

The quality of the effectiveness studies was mixed, with half the studies receiving high quality ratings (A) and half moderate (B) or low (C). The qualitative studies were of moderate to low quality.

We identified the following types of intervention:

- Job interview training
- Employment support
- Social skills training and psychoeducation
- Music and dance
- Support and mentoring (university students)
- General support services
- Peer support groups
- Specialist multi-disciplinary teams

Job interview training

Three controlled studies evaluated the effects of job interview training (total number of participants N=76) on interview skills. All the studies were conducted in the USA and participants were mostly male and in their teens or early twenties. All reported significant positive effects on observed interview skills (N=76). One found job interview training to have a non-significant positive effect on social functioning and depression (N=28). One found job interview training to have a non-significant positive effect on employment (N=26). These findings suggest that job interview training is effective in improving interview performance, but evidence regarding other outcomes (including employment status) is lacking.

Employment support

Three controlled and two uncontrolled studies evaluated the effects of employment support (N=174) on employment status, earnings and other outcomes. Three studies were conducted in the USA, one in Israel and one in the UK, and most participants were male and in their teens or twenties. All found significant positive effects on employment status (N=99). One controlled study found that supported employment has a significant positive effect on earnings, and one one-group study found a non-significant positive effect (N=59). One uncontrolled study found that supported employment had a non-significant negative effect on job performance and job satisfaction (N=9). One controlled study found that supported employment had no effect on self-esteem, and one uncontrolled study found that specialist training had mixed effects on quality of life and wellbeing (N=75). One controlled study (N=50) found that a digital support device significantly reduced the amount of job coaching required among people using employment support services.

Two studies also reported economic analysis of supported employment. One found that it had an incremental cost-effectiveness ratio of £5,600 or £1,467 per quality-adjusted life-year. The other found that it had a cost of between £4,281 and £6,542 per job found.

The evidence suggests that supported employment may be effective in increasing employment. Evidence is lacking for other outcomes.

Social skills training and psychoeducation

Fourteen studies (six controlled and eight uncontrolled) evaluated the effects of social skills training and psychoeducation (N=372) on autism symptoms, mental health outcomes, social support and other outcomes. Ten studies were conducted in the USA, one in the UK and three in other European countries, and most participants were male and in their twenties.

Four studies (two controlled and two uncontrolled) found that social skills training had significant positive effects on autism symptoms or empathy (N=90). One uncontrolled study found that social skills training had significant positive effects on depression and anxiety, and one further uncontrolled study found a non-significant positive effect on general mental health (N=54). Two controlled studies and one uncontrolled study found that social skills training had significant positive effects on social support or quality of socialisation and three further uncontrolled studies found non-significant positive effects (N=153). One controlled and three uncontrolled studies found mixed results regarding the effects on observed social behaviour. Two controlled studies and one uncontrolled study found that social skills training had significant positive effects on social skills; one further controlled study found a non-significant positive effect (N=150).

One controlled study found that a leisure lifestyle intervention had non-significant positive effects on outcomes related to leisure (N=12). One controlled study found that a group cognitive-behavioural programme and a recreational activity intervention did not differ significantly in their effects on autism symptoms, quality of life, or mental health outcomes (N=68).

The evidence suggests that social skills training may be effective for autism symptoms and quality of social life outcomes, but evidence is lacking for other outcomes, including those measuring mental health.

Music and dance interventions

One controlled and one uncontrolled study evaluated the effects of music and dance interventions (N=53) on a range of outcomes. One study was conducted in the USA and one in Germany, and most participants were male and in their teens or early twenties. The controlled study found that movement therapy had significant positive effects on wellbeing, anxiety and quality of socialisation, and a non-significant positive effect on empathy (N=31). The uncontrolled study found that music therapy had significant positive effects on peer relations, self-esteem and anxiety (N=22). One further qualitative study found that music therapy was perceived to be useful for increasing social interaction and self-confidence.

Overall, there is insufficient evidence to draw conclusions about the effectiveness of music and dance interventions.

Support and mentoring (university students)

Two small uncontrolled studies evaluated the effects of support and mentoring for university students (N=6) on social activities and academic attainment. Both studies were conducted in the USA, and participants were male and in their early twenties. One found that a social planning intervention had non-significant positive effects on social activities

(N=3) and both found mixed results for academic grades (N=6). One further qualitative study found that support and mentoring programmes were perceived as providing valuable individualised support, but also to be intensive in terms of time and effort.

The evidence is insufficient to draw conclusions about the effectiveness of support and mentoring for university students.

Safety interventions

One uncontrolled study evaluated the effects of road safety training (N=7) on safety behaviour and knowledge, and found mixed effects.

There is insufficient evidence to draw conclusions about the effectiveness of safety interventions.

General support

Two qualitative studies focused on services providing general support with the broad aim of improving health and social functioning, developing independent living, and reducing the use of specialist services. Both found that the services were perceived positively: particularly valued components were opportunities for social interaction and general practical and emotional support.

Although we identified no quantitative studies evaluating the effectiveness of general support, the limited qualitative evidence suggests that these services are valued by staff and users.

Peer support groups

Two qualitative studies focused on peer support groups and found that participants valued the opportunity for social interaction offered by these groups as well as the sharing of experiences.

The limited qualitative evidence suggests that peer support groups are valued by staff and service users.

Specialist multi-disciplinary teams

One economic study conducted cost-effectiveness modelling to evaluate the impact of a specialist multi-disciplinary support team for adults with HFA or Asperger's in England. An 80% probability that specialist multi-disciplinary support teams were cost-saving from a public-sector perspective was reported, with a net saving in the base-case scenario of £200 per 1,000 working-age people.

Overview of existing support services

We mapped the kinds of low-level support services that are currently being provided in England for adults with HFA based on three sources of data:

i) publicly available descriptions of Autism Innovation Fund projects

ii) a list of services provided by the project Advisory Group

iii) Autism Self-Assessment Exercise (SAE) returns for 2014

Where available in these documents, for each service we recorded the following information:

- Location
- Organisation
- Programme name
- Population
- Intentions/Aims
- Ingredients/Components
- Context

We grouped individual service components according to the emergent themes and cross-tabulated these components against the list of service providers. We then described narratively the type and range of service components and the ways in which they were configured.

Illustrative case studies

The 2014 Adult Autism Strategy *'Think Autism'* discusses 'low-level interpersonal support' in terms of enabling adults with autism to access social networks, advice and information, and gives the example of "Matthew's Hub" – a 'one stop shop' based in Hull that provides this kind of support for people with HFA and helps them to access statutory services. After consulting with the project Advisory Group, we selected three specific services from the mapping exercise to describe in greater detail. Two were selected on the basis of having provided reports to Department of Health following support from the Autism Innovation Fund; the project Advisory Group identified a third service that was well-established and could provide a contrasting service model to the other two case studies. Further information on these services was sought from publicly available sources and from direct contact with the service providers via email and informal telephone interviews.

Results of the service mapping

A total of 139 local services were identified from the three data sources. Of these, 11 entries either provided no information about service components, described services that were not focused on preventive support for adults, or were duplicate entries. We found the sources for the remaining 128 included services usually provided very little detail.

Service components

We identified 13 categories of intervention from the service mapping data:

- Teaching or training service users
- Employment support
- Individualised / one-to-one support
- Peer support
- Family / carer support
- Other support / activity groups
- Information resources / signposting
- Social or creative events and activities
- Advice and guidance
- Advocacy and liaison
- Teaching or training professionals / public / families / employers

- Needs assessment / post-diagnostic support
- Mentoring

Nine modes of delivery were identified:

- Drop-in / hubs
- Health professional involvement
- Telephone / email / online support
- Collaboration and coordination with other organisations
- Social enterprise
- Outreach services
- Assistive technology (mobile apps / cloud-based or virtual services)
- Social media
- Other

Few services were restricted to a single component and most providers described multicomponent services, employing an overlapping mixture of approaches.

Illustrative case studies

Leeds AIM was selected as it most closely fitted the *'Think Autism'* description of 'low-level interpersonal support'. It provides advice, mentoring, and information, with strong voluntary support, and signposts to relevant statutory services for direct intervention, if needed. Employment support (e.g. short coaching appointments, help with completing employment profiles) is also offered.

The second case study, Worcester Rainbow Autism provides specialist counselling, diagnosis and needs assessment within its Hub service. This is a predominately 'low-level' supportive service overlapping with statutory service provision. This is reflected in the fact that these services have received limited amounts of local authority or Clinical Commissioning Group (CCG) funds earmarked for their work around health and social care.

The third case study, Avon and Wiltshire BASS Autism Services for Adults is a more resource intensive clinically-driven multidisciplinary specialist service. Although this service might appear to be outside the low-level interpersonal support described in Think Autism, much of their post-diagnostic group-based 'advice service' appears similar.

Overall conclusions

Comparing the findings from the systematic review and the service mapping, it is clear that there is little or no research evidence relating to many strategies and components seen in descriptions of current services in England. This includes, for example: skills training other than social skills; individualised person-centred support; mentoring; information and advice; advocacy; and collaboration or liaison between services. This does not mean that these services are ineffective, only that there is a lack of research evidence. For some of the services currently provided such as employment support and social skills training there is underpinning research evidence which supports their continued use. There is no evidence of significant adverse effects of any intervention.

Information gathered from the service mapping suggests that some form of referral service or network is a necessary condition for the implementation of more specific interventions, if only to provide a point of access for potential service users. The service mapping also indicates that increased communication between practitioners, and service providers, is likely to be valuable. The service providers we spoke to directly, were aware of other low-level supportive services within their local regions, but not nationally. We identified a range of local services spread around the country, often addressing similar objectives, but with differing approaches. Rather than working in isolation, these services might benefit from sharing their experiences relating to appropriate staffing, working within funding constraints, creating a sustainable service, and managing relationships with statutory and voluntary services.

Future research could usefully focus on the person-centred strategies, such as peer support or hub centres, identified during the service mapping. Although it may be challenging to conduct robust evaluations of the impact of this type of service, qualitative research and studies of implementation might be feasible. Evaluation of specific interventions focused on employment and skills for independent living would usefully add to the evidence base. All new research studies should aim to represent the diversity of the population with HFA, and where possible to measure more practice-relevant outcomes with longer follow-up.

1. Background

1.1 Policy background

Over half a million people in England are estimated to have an autism spectrum disorder.[1] Autism spectrum disorders are lifelong neurodevelopmental conditions, which affect communication and social relationships.[2] People with autism spectrum disorders are affected in different ways and therefore their support needs will vary. People with autism and their families often face difficulties when trying to access appropriate support, and professionals may not always understand or be able to adequately respond to their needs. Historically this has particularly been the case for people with "high-functioning" autism spectrum disorders, i.e. those without learning disabilities, who may need considerable support, but have often been deemed ineligible for services.

People with high-functioning autism (HFA)[*] may particularly benefit from preventive support which aims to reduce the use of statutory services, and prevent the escalation of need. This is a focus of the original Adult Autism Strategy for England *Fulfilling and Rewarding Lives*, supported by the Autism Act 2009, which recommended that policy bodies take "a more preventative, supportive approach",[3] in order to avoid mental health crises and the potential consequences in terms of service use.[4] Local Authorities and health services are also required to provide preventive services for adults with autism spectrum disorders and support for people in their communities as part of their duty under the Care Act 2014. Both *Fulfilling and Rewarding Lives* and the Care Act 2014 emphasised the need to focus on early support, which may include, for example, befriending, mentoring and advocacy services, as opposed to later crisis management (although such services may not be funded by the DH). The most recent update of the Adult Autism Strategy[1] further emphasises the importance of services based around low-level interpersonal support to enable people to participate in social and leisure activities, and access support networks, advice and information. The statutory guidance issued in support of the strategy explicitly mentions the need to provide appropriate supportive services for adults with autism "regardless of whether they are eligible for social care".[4]

While low-level support services are not exhaustively defined in existing legislation or guidance, they can be understood broadly as non-intensive services aiming to provide general support, which is not directed at treating a clinical problem or deficit, to people in their everyday lives. This might include, for example, practical support, social and emotional support, befriending and opportunities for social interaction, peer-led interventions, education or training, and brokering or advocacy around employment or services, delivered in a range of settings, including health services, social care or the community, as well as phone- or internet-based services. Low-level support may involve multi-disciplinary teams and/or liaison between multiple service providers, and signposting individuals to services based on their individual needs.

[*] Throughout the report, the term 'high-functioning autism' (HFA) includes Asperger's Syndrome. The term 'high-functioning' is rejected by many in the autism community but is used here as a shorthand descriptor for 'autism spectrum disorder without learning disability'.

Despite the emphasis in current policy on the importance of preventive and supportive services for adults with HFA, there is concern about whether people can access appropriate preventive support. Our initial engagement with stakeholders (see under "Advisory Group" below) suggests that unmet needs for people with HFA may be a particular concern. Research with the autism community has also identified that research on 'real-world' services, which aim to support people in their day-to-day lives and employment, is seen to be under-served by current funding priorities.[5] We know little about the effectiveness and cost-effectiveness of supportive services for this population as the evidence has not previously been systematically reviewed. While there are reviews on specific areas, such as vocational services[6] or social skills training,[7] [8] no previous systematic review has looked across the whole range of interventions for this population. There is a need to understand which supportive services have been rigorously evaluated, which are likely to be effective, and how this evidence fits into the broader practice landscape.

1.2 Overview of the project

This project aimed to find and synthesise evidence to support the services for people with HFA currently delivered in England. In order to do this, we needed both to review the evidence, and to establish what services are currently available in practice. Thus, the project has two phases:

1) a systematic review of international research evidence on the effectiveness and cost-effectiveness of low-level support services for adults with high-functioning autism
2) a descriptive map of existing support service provision for adults with high-functioning autism in England

The report presents the finding of these two phases in order. The final section of the report draws together the findings from the systematic review and the service mapping, and reflects on the overall lessons that can be drawn from the project.

1.3 Advisory Group

An initial meeting organised by the Department of Health to discuss the project remit was attended by service user representatives, practitioners and policy stakeholders. Most of those attending joined our Project Advisory Group. The Advisory Group met in January 2016, with further communication and consultation (via email and telephone) throughout the project. The Advisory Group:

- contributed to defining the scope of the project
- informed the development of the project protocol
- informed the choice of methods, particularly for the service mapping
- identified data and examples for the case studies undertaken as part of the service mapping
- informed the synthesis and presentation of the data from the review
- provided feedback on the structure and aims of the service mapping
- provided feedback on draft outputs, including the evidence summary.

The full membership of the Advisory Group can be found in Appendix 6.

2. Methods

We followed CRD guidance for undertaking reviews in health care[9] and report the findings according to the PRISMA statement (www.prisma-statement.org). The review was registered on PROSPERO (registration number CRD42015029662).

2.1 Review question

> *What is known about the effectiveness, cost-effectiveness, and barriers and facilitators of low-level support services for adults with HFA?*

2.2 Searching

We searched the following databases:

- ASSIA
- EMBASE
- ERIC
- MEDLINE
- PsycINFO
- Social Care Online (simplified strategy)
- Social Policy and Practice

The strategy combined: (autism or Asperger's) AND (adults) AND (low-level support). The full search strategy used for the MEDLINE database is reported in Appendix 1.

We handsearched the following journals for the last five years:

- *Autism*
- *Journal of Autism and Developmental Disorders*

We also carried out Google searches using terms for autism and terms for types of low-level support, as well as names of specific intervention programmes. We scanned the lists of included studies from systematic reviews whose scope overlapped with the present review (e.g. reviews of support interventions for adults with autism generally).

2.3 Screening

Two reviewers independently screened an initial sample of 10% of records, and resolved any differences by discussion. A single reviewer screened the remaining 90% of records. We attempted to retrieve the full text of all records that met the criteria at abstract stage, or where it was unclear if they met the criteria. Two reviewers independently screened all full-text records and resolved differences by discussion. We used EPPI-Reviewer 4 software to manage the data for both screening and data extraction.

2.3.1 Inclusion / exclusion criteria

We applied the following exclusion criteria in order:

1. Not primary empirical intervention study
2. Not adults with high-functioning autism
3. Not low-level support
4. Not relevant outcome
5. (full-text) Not English language

In more detail, the criteria applied were as follows:

1. Does the study present primary empirical data of relevance to an intervention?

> *Include* any evaluation study reporting pre-post data or random allocation, including trials, one-group studies and retrospective studies with pre-post data; *include* process evaluations and qualitative research which reports substantive data on an intervention; *include* any economic analyses (cost-effectiveness or cost-benefit analyses) of interventions.
>
> *Exclude* observational or qualitative studies which may include data on services generally, but do not relate to (a) specific intervention(s). *Exclude* case studies without primary qualitative or quantitative data. *Exclude* studies with minimal qualitative data (i.e. one or two quotes only) at full-text stage. *Exclude* cost-only studies. *Exclude* non-systematic reviews; retain systematic reviews whose scope may overlap with this review for reference checking.

2. Does the study include participants with HFA aged 18 years or over, or their families or carers, or evaluate an intervention for people with HFA?

> *Include* any autism spectrum disorder (ASD), including Asperger's Syndrome (AS), without learning disability; *include* participants without a formal diagnosis if the intervention is mainly aimed at ASD; *include* at abstract stage if population is reported as ASD but not further specified (i.e. if it is unclear whether participants are high- or low-functioning), but *exclude* at full text if there is no information on IQ or learning disability. *Include* as high-functioning participants with reported IQ≥70, 'normal' or 'average' cognitive level, and/or with a diagnosis of Asperger's Syndrome. *Include* studies of professional training if the intervention is designed to support delivery of a specific service for people with HFA. *Include* studies of mixed populations including HFA along with other populations (either non-autistic and/or learning-disabled) if people with HFA represent ≥50% of the sample, otherwise *exclude*. *Include* studies where the mean age of the sample is ≥18 years. At abstract stage *exclude* abstracts describing population as 'children' or 'schoolchildren', but *include* those describing them as 'young people' or 'adolescents', or focusing on transitions to adulthood (also exclude non-ASD parents of young children with ASD).

3. Does the study evaluate a low-level support intervention?

> *Include* any service designed to support individuals in their daily lives, including: the provision of advice, information, or advocacy services; assistance in accessing services; peer support or support groups; supported employment; support with social interaction or participation. *Exclude* clinical interventions including

individual psychotherapy and cognitive-behavioural therapy, any intervention mainly focused on reducing specific psychological morbidity (e.g. anxiety, sensory disorders, repetitive behaviour), and facilitated communication.

4. Does the study report data on a policy- or practice-relevant outcome?

Exclude tests of purely cognitive or knowledge outcomes, for example: tests of recognition of facial affect (e.g. Face Emotion Identification Test); tests of emotional cognition (e.g. Cambridge Mind Reading battery; Hinting Task); tests of knowledge about social skills (e.g. Test of Young Adult Social Skills Knowledge); tests of cognitive skills or memory; correct task performance or rule-following. *Include* all other outcomes, either self-rated or observer-rated. For example: social behaviour, including questionnaire instruments (e.g. Social Responsiveness Scale) or ratings of observed behaviour; participation in social situations; quality of social relationships (e.g. Index of Peer Relations); any outcome relating to attitudes or perceptions; quality of life or wellbeing; autism symptoms; job performance, employment or wages earned; any mental health outcome (e.g. depression, anxiety); independence or activities of daily living; etc.

5. (Full-text screening only) Is the study published in English?

Include studies with a report available in English; *exclude* studies only reported in other languages.

It should be noted that criterion (3) did not narrowly restrict inclusion to paradigmatic low-level support services described in the relevant policy documents (see discussion on page 8 above). Rather, given the limited volume of evidence overall, we included any intervention which could form part of a supportive strategy, only excluding those narrowly focused on treating specific psychological problems. (The issues arising from this, in terms of relating the evidence base to practice, are discussed on page 74 below.)

2.4 Quality assessment and data extraction

Included studies were classified into three types: effectiveness studies (i.e. any study presenting quantitative outcome data); economic studies (cost-effectiveness studies and any other form of economic evaluation); and qualitative studies. We assessed the quality of effectiveness studies using a version of the EPHPP tool (http://www.ephpp.ca/PDF/Quality%20Assessment%20Tool_2010_2.pdf) as modified by Thomson et al.[10] We assessed the quality of economic evaluations using the tool in the CRD *Handbook*,[9] which is based on Drummond et al.'s checklist.[11] We assessed the quality of qualitative studies using Hawker et al.'s tool.[12] For all studies, we extracted data using a standardised form including information on: sampling and recruitment; sample characteristics; the content of the intervention and comparison (if applicable); methods of data collection and analysis; and the results. For mixed-methods studies reporting both effectiveness and qualitative data, we used the QA and DE forms for effectiveness studies. Full data extraction is reported in the evidence tables in Appendix 8. For effectiveness studies, we extracted (a) all relevant outcomes as defined by inclusion criterion 4 (above) for which pre and post data were reported, and (b) information on satisfaction, acceptability or feasibility (but not on fidelity, adherence or implementation) that was not reported as pre and post outcomes. (These are included in the evidence tables under (a)

'Results (effectiveness)' and (b) 'Results (other)'.) All quality assessment and data extraction were carried out by one reviewer and checked by a second.

2.5 Approach to synthesis

We had planned to take a 'best evidence' approach to synthesis, where we categorise the studies according to intervention type and then, within each, focus on the highest-quality evidence. However, as the number of studies (particularly high-quality studies) was relatively small, we included all studies in the synthesis.

We initially formulated a logic model (Figure 1) based on information obtained from current policy documents, information received from Advisory Group members, and our initial scoping searches of the literature. The logic model sets out a schematic overview of the kinds of components that might be included as part of an intervention, the intermediate outcomes and mechanisms through which they could work, and the primary outcomes they could impact on. The logic model can be seen as a summary of the 'programme theories' underlying the synthesis.[13]

We synthesised the data narratively, following the principles outlined in the ESRC Guidance on narrative synthesis.[13] We organised the studies inductively into broad categories of intervention types and summarised each study in terms of population, context, intervention content, study design and findings. We did this separately for all three study types (effectiveness, economic and qualitative studies). In parallel, we tabulated the findings of the effectiveness studies in terms of the direction and significance of effect observed for each outcome (Appendix 7), and used this table to produce a brief summary of the nature of the evidence by intervention type. It should be noted that because many studies were small, with limited statistical power, and several did not report significance, we have included the direction of effect in these summaries even where findings do not reach significance in the study authors' analyses. We also produced forest plots of standardised mean differences (without pooling) to provide a graphical overview of the findings. (It should be noted that the forest plots only include studies with a control group, and represent the difference in outcomes between the intervention and control group rather than the within-group change.) The qualitative studies were summarised thematically within intervention types. In a separate analysis, we also summarised the findings by outcome type to illustrate which type of intervention might be best suited to achieving particular outcomes.

Within the narrative, the effectiveness studies are presented first (ordered by study design, then by sample size, as in Appendix 7) followed by the cost-effectiveness and qualitative studies. At the end of each section, we considered the nature and limitations of the evidence for each intervention category, its transferability, and the feasibility and possible cost of the interventions, as well as their effectiveness and cost-effectiveness.

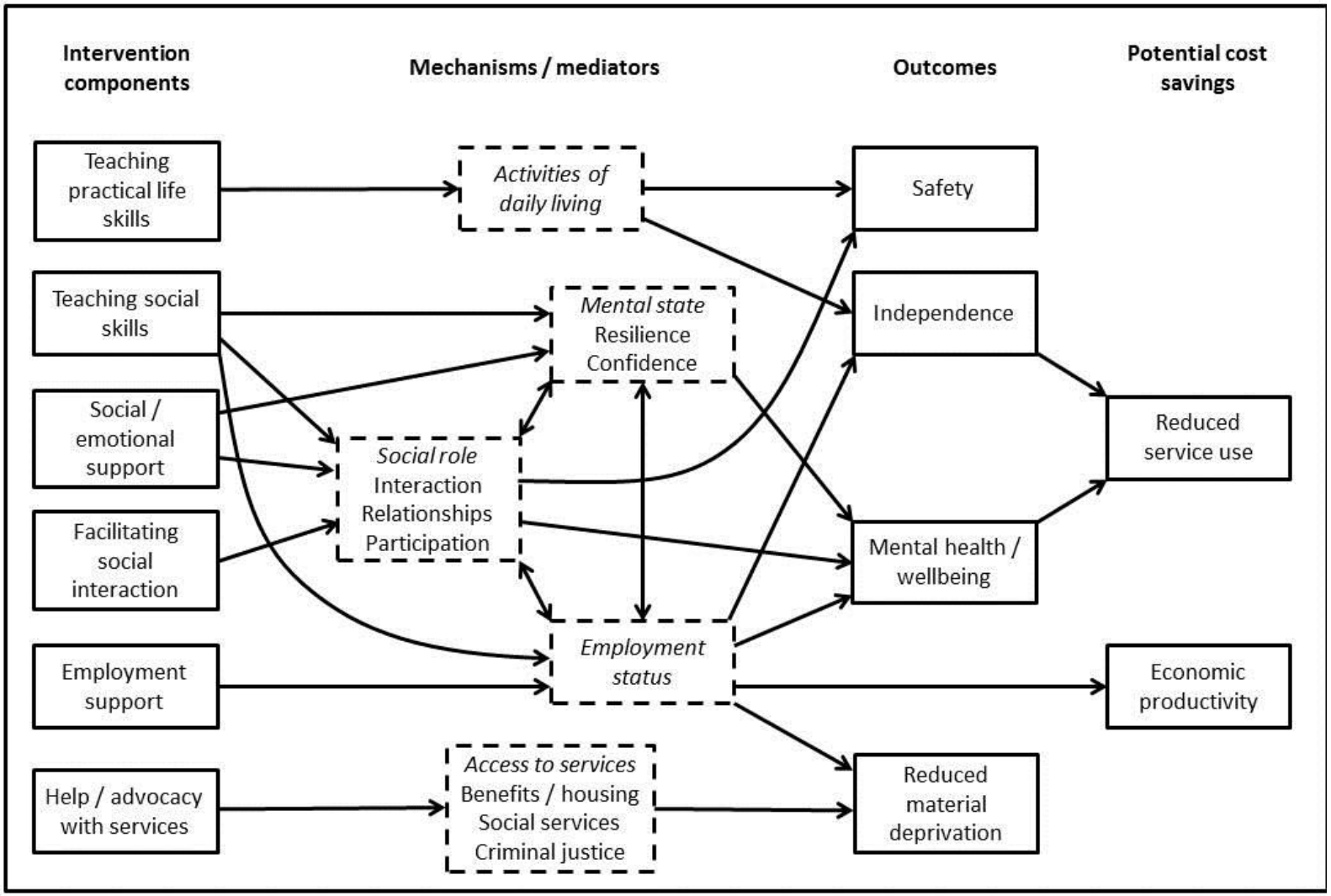

Figure 1: Logic model

3. Findings

3.1 Results of searching

The database searches located 9,506 unique records. Handsearches and web searches contributed a further six records.

Thirty-seven full-text studies were included in the final synthesis: 27 effectiveness studies, three economic studies, and eight qualitative studies (one study reported both effectiveness and qualitative data). The flow of literature is shown in Figure 2.

As Figure 2 indicates, the full text of a substantial number of records (N=53) could not be retrieved in time to be assessed for inclusion in the review. These records were mostly non-UK theses or reports in non-academic periodicals (e.g. newsletters for practitioners) and therefore unlikely to meet the criteria for inclusion.

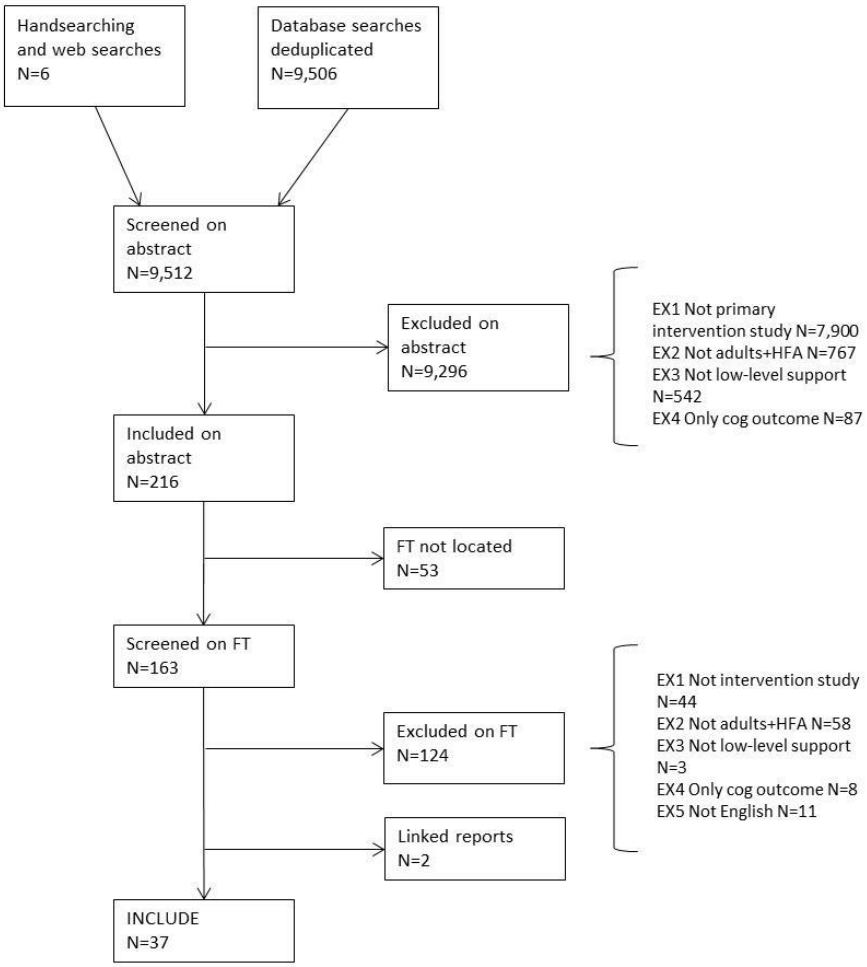

Figure 2: Flow of literature through the review

3.1.1 Study quality and population characteristics

Table 1 shows the results of quality assessment for the effectiveness studies, and Table 2 that for the qualitative studies. Tables 1 also shows the sample sizes for the studies and a summary of the demographics of the participants.

Overall, the quality of the effectiveness evidence was mixed, with roughly equal numbers of studies receiving a high-quality rating (A) or a low-quality rating (C). Nine studies used a randomised controlled trial design; five used a non-randomised controlled design; and thirteen used an uncontrolled (one-group) design. Study quality was unevenly distributed across intervention type (see Table 3 below). The main issue with studies that received low-quality ratings was the use of uncontrolled designs; the handling of selection bias was also a weakness, with few studies providing full details of sampling and recruitment of participants. More recent studies appeared to be of higher quality, particularly with respect to study design; most randomised trials were published in the last two to three years.

The quality of the qualitative studies was generally medium to low, with one or two exceptions. (Note that the one study which was included as both an effectiveness study and a qualitative study was quality-assessed as an effectiveness study only.) Again, sampling and recruitment were weaknesses of these studies, and several also received low ratings on the domains 'data analysis', 'ethics and bias' and 'generalisability and transferability'.

Full QA results for the economic studies are reported in Appendix 5. Broadly, two studies were of higher quality[14, 15] and one lower.[16]

Table 1: Quality assessment results and population characteristics for effectiveness studies

Reference	Study design	1. Selection	2. Study	3.	4. Blinding	5. Data	6.	Overall rating	Sample size	% male	Mean age
Bonete (2015) [17]	nRC	C	A	A	B	A	A	A	10	86	NR
Cunningham (2014)	nRC	B	A	B	B	A	A	A	38	79	NR
Eack (2013) [19]	1-G	B	B	C	B	C	B	B	14	86	25
Gal (2015) [20]	1-G	C	B	C	B	B	B	C	25	96	19
Gantman (2012) [21]	RCT	C	A	A	B	A	A	A	17	71	20
Gentry (2015) [22]	RCT	C	A	A	B	B	A	A	50	84	24
Hesselmark (2014) [23]	RCT	A	A	A	B	B	B	A	68	55	32
Hillier (2007a) [24]	1-G	C	B	C	B	A	C	C	13	85	19
Hillier (2007b) [25]	1-G	C	B	C	B	C	B	C	9	88	22
Hillier (2011) [26]	1-G	C	B	C	B	B	C	C	49	86	21

Hillier (2012) [27]	1-G	C	B	C	B	B	B	C	22	82	18
Howlin (1999) [28]	1-G	C	B	C	B	B	A	C	10	100	28
Kandalaft (2013) [29]	1-G	C	B	C	B	B	A	C	8	75	21
Koch (2015) [30]	nRC	C	A	B	B	A	A	A	31	74	22
Koegel (2013) [31]	1-G	C	B	C	B	B	A	C	3	100	22
Laugeson (2015) [32]	RCT	C	A	A	B	B	A	A	22	77	20
Mawhood (1999) [16, 33]	nRC	C	A	B	B	C	A	A	50	94	30
Morgan (2014) [34]	RCT	C	A	A	A	A	A	A	28	96	25
Ness (2013) [35]	1-G	A	B	C	B	B	A	B	3	67	22
Palmen (2011) [36]	nRC	C	A	B	B	C	A	A	12	83	21
Pugliese (2013) [37]	1-G	C	B	C	B	A	C	C	5	100	21
Saiano (2015) [38]	1-G	C	B	C	B	C	A	C	7	100	29
Smith (2014) [39, 40]	RCT	C	A	A	A	A	A	A	26	77	24
Strickland (2013) [41]	RCT	C	A	A	A	A	A	A	22	100	18
Turner-Brown (2008)	RCT	C	A	A	A	B	A	A	11	91	36
Wehman (2014) [43]	RCT	C	A	A	B	A	A	A	40	72	20
White (2015) [44]	1-G	C	B	C	B	B	A	C	5	100	24

Key: A=high, B=medium, C=low. See Appendix 2 for details.
Study design column: RCT, randomised controlled trial, nRCT, non-randomised controlled trial, 1-G, one-group study

Table 2: Quality assessment results for qualitative studies

Reference	1. Abstract and title	2. Introduction and aims	3. Method and data	4. Sampling	5. Data analysis	6. Ethics and bias	7. Results	8. Transferability	9. Implications
Ford (2009) [45]	2	1	2	3	2	2	1	3	2
Fullerton (1999)	2	3	1	2	1	2	2	2	3
Greher (2010) [47]	3	1	3	3	4	3	3	3	3
Jantz (2011) [48]	2	1	2	2	2	3	2	3	1
MacLeod (2007)	3	3	3	4	4	2	2	4	2
Marwick (2007)	2	3	3	4	4	4	3	4	3
Ridout (2011) [51]	2	2	2	3	4	2	2	3	2

Key: 1=good, 2=fair, 3=poor, 4=very poor. See Appendix 4 for details.

3.2 Results

The studies were grouped into nine categories according to intervention type. Table 3 shows the categories and the number of studies of each type included in the synthesis, plus the quality categories for the effectiveness studies. As Table 3 shows, the higher-quality evidence mainly concerned employment and social skills interventions. For some categories, including general support and peer support groups, neither effectiveness nor cost-effectiveness data were located.

Table 3: Intervention categories and study types

Intervention type	Effectiveness total	Effectiveness A	Effectiveness B	Effectiveness C	Economic	Qualitative
Job interview training	3	3	0	0	0	0
Employment support	5	3	0	2	2	0
Social skills training & psychoeducation	14	7	1	6	0	1
Music / dance	2	1	0	1	0	1
University student support & mentoring	2	0	1	1	0	2
Safety	1	0	0	1	0	0
General support	0	0	0	0	0	2
Peer support groups	0	0	0	0	0	2
Specialist multi-disciplinary teams	0	0	0	0	1	0

3.2.1 Job interview training

Three RCTs evaluated the effects of job interview training (total number of participants N=76) on interview skills. All the studies were conducted in the USA and participants were almost all male and in their teens or early twenties.

Three studies evaluated specific training programmes to improve skills related to job interviews, using mainly didactic educational strategies to improve participants' performance and reduce the incidence of inappropriate responses or behaviour. This category overlaps with the more general employment support interventions (following section), in that some of the latter also offered interview training as part of a broader programme, but the three studies in this category focused on interview training alone.

One study[34] (quality rating A) evaluated a social skills curriculum focused on improving performance in job interviews. The study was conducted in the USA and participants were on average in their mid-twenties, almost all were male, most had some college education, and the average IQ was 103. The programme took the form of 12 weekly meetings that

included didactic education, discussion and roleplays, delivered by a job coach with experience of working with adults with ASD. The session topics were summarised as: "(1) Character, attitude, and persona, (2) Small talk, non-verbal communication, and hygiene, and (3) Interview questions, closing the interview, and follow-up." (p2295).

The study used a randomised trial design with a wait-list (no intervention) control. The primary study outcome was performance on a mock interview, which was video-recorded and then coded by trained research staff using the Social Pragmatic Scale, an instrument covering various social skills relating to job interview performance. The study also measured the social subscale of the Vineland Adaptive Behavior Scale (reported by participants' parents) and the Depression scale of the Patient Health Questionnaire (self-reported). Follow-up was shortly after the completion of the (12-week) intervention, six months from baseline. The study found that intervention group participants improved significantly[†] more than controls on job interview performance. However, changes on the Vineland social scale and the PHQ Depression were not significant, although positive trends were observed.

One study[40] (quality rating A) evaluated a training programme using a virtual reality (VR) environment. The study was conducted in the USA and participants were on average in their mid-twenties and most were male. The intervention consisted of a simulated job interview using a large corpus of video-recorded questions and trainee responses, using speech recognition software, to train participants in identifying appropriate responses. The programme led participants through graded levels of difficulty and offered immediate feedback and scoring of performance at the level of individual responses. Participants completed 10 hours (approximately 20 trials) of the programme over two weeks.

The study used a randomised trial design; the control group received usual treatment (no further information about the control group was reported). The primary study outcome was performance in a mock interview which was video-recorded and rated by trained research staff. This included participants' abilities in: "conveying oneself as a hard worker (dependable), sounding easy to work with (teamwork), conveying that one behaves professionally, and negotiating a workable schedule" (p2452).Rating outcomes included nine domains covering self-presentation, negotiation skills, and rapport with the interviewer. Participants also completed a questionnaire assessing their self-confidence regarding job interviews. These outcomes were measured at two-week follow-up. In addition, a separate publication[39] reported employment outcomes at six months after completion of the intervention, specifically the number of job interviews undertaken and job offers received and accepted. At two weeks, the study found that the job interview performance score improved significantly more in the intervention than in the control group. There was a non-significant positive effect on self-confidence. At six months, the study found that, while more intervention than control participants had completed interviews, received job offers and accepted positions, these differences were not significant. A logistic regression was also reported, indicating an adjusted odds ratio for intervention, compared with control, of 7.82 (95% confidence interval 1.02 to 59.4) of accepting a competitive position.

[†] Here and throughout the report, 'significant' means 'statistically significant' unless otherwise specified.

One study[41] evaluated a web-based interview skills programme. The study was conducted in the USA and participants were all male, aged between 16 and 19 years, and had an average socioeconomic status score (parental occupational status) of 6.76 out of 9. All participants had either HFA or Asperger's Syndrome. The programme was mainly didactic and web-based, including step-by-step instructions and video scenarios, along with quizzes and other content. The programme (JobTIPS) originally covered employment in general; for this study additional content on behaviour in job interviews was added, including material on appropriate responses, greetings, and visual reminder cues. Participants then undertook a single practice session in a virtual reality environment with an avatar controlled by a clinician playing the interviewer. The interviewer provided feedback and opportunities to rehearse unsatisfactory responses.

The study used a randomised trial design with a no-intervention control group. The primary outcome measure was performance on a mock interview, rated on two subscales: content, covering the appropriateness of responses; and delivery, covering verbal and non-verbal behaviour during the interview. Follow-up took place approximately nine days from baseline. The study found that intervention participants improved significantly more than controls on the content scale, and near-significantly on the delivery scale.

Three RCTs found job interview training to have a significant positive effect on observed interview skills (total number of participants N=76). One RCT found job interview training to have a non-significant positive effect on social functioning and for depression (N=28). One RCT found job interview training to have a non-significant positive effect on employment (N=26). See Figure 3.

Overall, the evidence in this group is robust, with three studies all using randomised designs and receiving quality ratings of A, although there were some limitations in reporting (particularly on sampling and recruitment, and on services received by control participants). All studies observed a significant short-term effect on mock interview performance, using specially developed rating scales. However, it is unclear whether this would generalise to real-world performance, particularly where rating scales were developed in close conjunction with intervention content. Findings on distal outcomes were more equivocal: one study[34] found positive trends on social skills and depression, and another[39] on employment status, but in neither case did this reach significance. These findings provide some indicative evidence of longer-term impact on more substantive outcomes, but are not conclusive.

The interventions were probably not resource-intensive: two interventions were delivered primarily by computer, one with very limited staff input and the other with a single one-to-one session, and the third was group-based and fairly brief. All the evidence was from the USA, but there were no obvious barriers to transferability to a UK context. Almost all the participants were male, and most were young and appeared to be of relatively high socio-economic status.

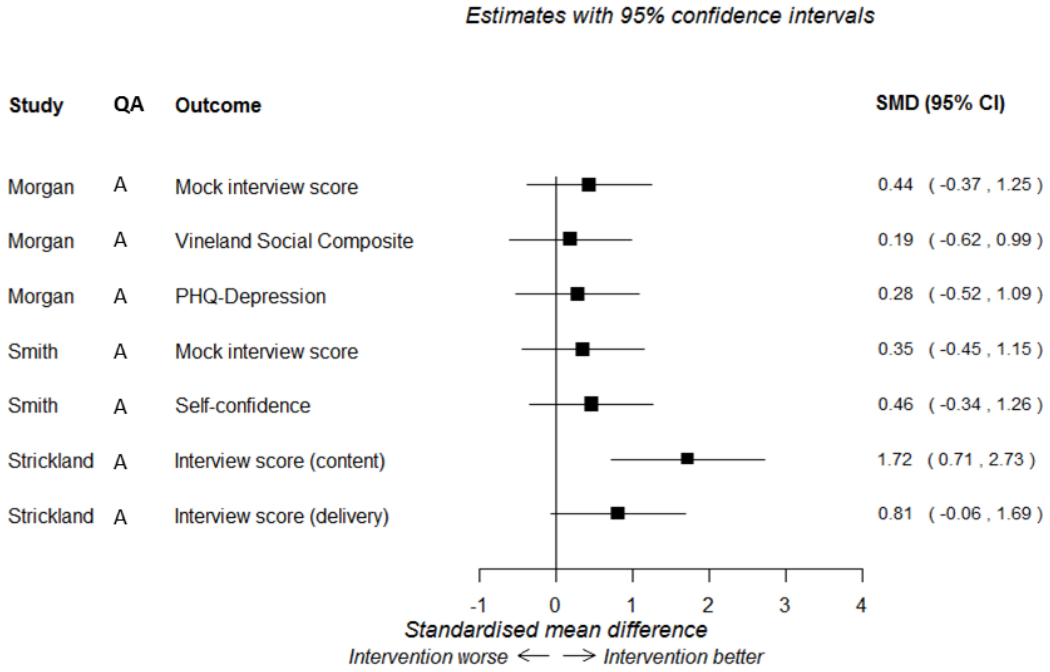

Figure 3: Forest plot: Job interview training

3.2.2 Employment support

Two RCTs, one nRCT and two one-group studies evaluated the effects of employment support interventions (total number of participants N=174) on employment status, earnings and other outcomes. Three studies were conducted in the USA, one in Israel, and one in the UK, and most participants were male and in their teens or twenties.

Two studies reported economic analyses of employment support interventions.

Seven studies evaluated some form of employment support; five were effectiveness studies and two economic studies. Both the economic studies referred to the same effectiveness data. The interventions in this category included both comprehensive employment support and more focused interventions to assist with employment-related problems.

One study[22] (A) evaluated the use of iPod Touch devices to assist workers with ASD in the context of an employment support and job coaching programme. The study was conducted in the USA and most participants were male, with a mean age of 24 years. The intervention included a workplace assessment by an occupational therapist in conjunction with the participant, their employer and their job coach. Following this, an iPod Touch with a suite of applications was provided to each participant and training given in its use; the training gradually faded as the participant learned to use them as part of their workday. The actual applications used mainly focused on reminders, prompts and task lists.

The study used a randomised trial design, with a delayed-treatment control group, who received standard job placement services (i.e. both groups received employment support services, but only the intervention group were given the iPod). Outcomes measured

included: hours of job coaching received; hours worked per month; Supports Intensity Scale (SIS) – Employment subscale (to measure the participants' need for work-related support); and Employee Performance Evaluation Report (EPER; a measure of overall work performance completed by job coaches). Outcomes were measured every four weeks, over 24 weeks, with the control group starting to receive the intervention at 12 weeks. The study found that scores on the SIS and EPER instruments did not differ between groups at any time point, and hours worked did not differ at 12 or 24 weeks. However, the intervention group received significantly fewer job coaching hours than the control group at 12 weeks (9 hours/month less). The authors of the study interpreted these findings to mean that the intervention successfully reduced the need for job coaching services, while not reducing job performance. However, at the first time-point this outcome was measured (four weeks) there was already a significant difference between intervention and control groups; it then declined markedly in the control group before they started receiving the intervention at 12 weeks (from 35.5 to 16.6 hours/month), with limited further improvement after they started receiving it (to 11.2 hours/month at 24 weeks). It is thus open to question whether the difference observed at 12 weeks represented an effect of the intervention.

The authors of this study also presented a brief cost analysis, estimating on the basis of the figures for job coaching hours that the intervention saved US $2,025 per participant over the whole 24 weeks of the programme (a cost of US $3,996 with the intervention as against US $6,021 for the usual service).

One study[43] (A) evaluated an internship programme, Project SEARCH Plus ASD Supports, for young people with ASD in their final year of high school. The study was conducted in the USA and participants were in their late teens or early twenties and most were male, with a diagnosis of autism. The intervention was initially developed for people with learning disabilities and adapted for this study for people with autism spectrum disorders; the sample included some participants with learning disability, with a quarter having a primary special educational need category of intellectual disability (the exact proportion with learning disability was unclear). The main component of the intervention was internships at two hospitals, lasting for one school year (nine months). Participants attended classes at the internship sites for part of the day, focusing on work-related skills including using transport, communicating with supervisors and co-workers, etc. They then undertook three different internships over the course of a year. They also received case management and job coaching services, and behavioural interventions, if required. The intervention involved a full-time teacher and two full-time employment specialists at each of two sites, as well as input from business liaisons and an offsite team who provided oversight and ensured implementation fidelity.

The study used a randomised trial design, with a usual-treatment control group, who received their normal educational services. Participants were followed up for 12 months, with an intermediate time-point at nine months (on completion of the programme). Outcomes included employment status (self-reported) and the Employment subscale of the Supports Intensity Scale, measuring participants' support needs. The study found that all participants were unemployed at baseline and there were significant differences in employment status between intervention and control group at both follow-up points (87.5% against 6.25% at both time-points). Intervention participants also showed

significantly lower support needs at 12-month follow-up as measured by the Supports Intensity Scale.

One study[33] (A) evaluated a comprehensive supported employment programme for adults with Asperger's Syndrome or HFA. The study was conducted in the UK, the programme was run in conjunction with the National Autistic Society (the programme was later named 'Prospects') and most participants (in the intervention group) were male, with a mean age of 31 and mean IQ of 99; three-quarters had a diagnosis of Asperger's Syndrome. The intervention included liaison with a range of employers to identify suitable jobs and to educate them on potential issues, as well as ongoing job support by caseworkers who helped participants deal with any employment-related problems. Participants were registered with the service for an average of 17 months. Intervention participants received a mean of 49 hours of support in the first month, declining to five hours in the fourth month; the total cost per client per month was estimated at £672 for the first year and £388 for the second year.

The study used a non-randomised controlled design with a comparison group of people meeting programme criteria, but living in other geographical areas (outside London), who were recruited separately; it is unclear whether they accessed any other services. The groups were not matched *a priori,* but were found not to be significantly different on IQ and language abilities. The outcomes included employment status, time in work, and earnings, as well as self-esteem (Rosenberg Self-Esteem Inventory). Participants were followed up for two years. The study found that the number of people in work increased significantly more in the intervention group than in the control group. There was a non-significant trend towards an increase in time spent in work in the intervention group. Hourly earnings were significantly higher for the intervention group than the control group at post-test. There were no significant changes in self-esteem in either group. (A further follow-up, seven to eight years later, published in a separate report[16], found that most of the intervention participants who found work in the original study period were still employed.)

One study[20] (C) assessed a comprehensive supported employment programme in the context of civilian military service, which also included some broader elements of support and social skills. The study was conducted in Israel and almost all the participants were male, with a mean age of 19; half had a diagnosis of Asperger's Syndrome. The intervention consisted of a three-month training programme, which combined job training in interpreting aerial photographs, with a broader skill development programme including: general work skills; daily living skills (e.g. using public transport); communication and social skills; and self-advocacy. Both army personnel and civilian health and psychology professionals were involved in delivering the intervention. The course was fairly intensive, taking place for 30 hours per week over three months. The study period further covered the six months after the completion of the course, during which participants worked in their designated jobs.

The study used an uncontrolled one-group pre-post design. The outcomes included the Quality of Life Questionnaire (QOL-Q; four subdomains) and the Personal Wellbeing Index (PWI; eight subdomains). Participants were followed up for nine months, with an intermediate time-point at three months (the end of the training course and before

participants started employment). The study found that quality of life did not change significantly from baseline to three months (i.e. over the duration of the training course), measured by total quality of life scores or by any subdomain; however, at nine-month follow-up both total scores and three of four subdomains had improved significantly. On the Personal Wellbeing Index only one of eight subdomains (safety) improved significantly at three months; four further subdomains showed non-significant positive change, and three non-significant negative change. At nine months seven of eight subdomains showed some positive change, but significance was not reported.

One study[25] (C) evaluated a specialist employment support service for adults with ASD. The study was conducted in the USA and all but one of the participants were male, with a mean age of 22 years and mean IQ of 111. The programme was run by a part-time programme co-ordinator who initially helped participants search for jobs, fill out application forms and create a favourable impression at interview. When a job was located the co-ordinator then liaised with the employer to address any potential problems and with the participant to facilitate successful employment, and provided coaching support on an ongoing basis.

The study used an uncontrolled one-group pre-post design. Hourly income was measured before and after the placement; participants' support needs, job performance and social integration (conducted by work supervisors), and participants' satisfaction with their jobs were measured beginning at three months post placement. The study followed up participants for 12 months from initial job placement (i.e. longer than this from the time of their initial contact with the programme). The study found that the number of employed participants increased from two to nine, and their mean hourly income increased from US $1.60 before placement to US $7.10 after it. Assessment of participants' job performance improved from three to 12 months on 12 of 17 items, and assessment of social integration improved on six of six items; participants' job satisfaction improved on three of 10 items and became worse on six of 10 (significance was not reported for any of these outcomes). However, no data were available on these outcomes prior to three months after placement.

Two studies reported economic analyses: one was a simple comparison of costs and outcomes and the other was a much more sophisticated cost-effectiveness model, both were based on the effectiveness results from Mawhood and Howlin's study.[33] One was Howlin and colleagues' own follow-up study.[16] This used data from the intervention arm of Mawhood and Howlin's study,[33] along with follow-up data on costs and observational data on outcomes from subsequent years of the scheme, to estimate the cost per job found. This study found that expenditure per job found was £6,542 in 2000 to 2001 and £4,281 in 2002 to 2003.

The other economic study[14, 52] used the same data on the Prospects evaluation, from both the original study and the follow-up (identified on the basis of a systematic review). The analysis was undertaken for a NICE guideline and included a cost-utility analysis based on a Markov model, with costs assessed from the perspective of the NHS and social services. Benefits included in the model covered the utility gain to individuals resulting from employment, as well as the reduced use of supported accommodation, health services and social services. Modelling only the utility resulting from employment, the analysis found an

incremental cost-effectiveness ratio (ICER) of supported employment relative to standard care (day services) of either £5,600 or £1,467 per quality-adjusted life-year (QALY)[‡]. When accommodation costs were included as well as utility values, supported employment was found to dominate usual care (that is, it both had lower costs and better outcomes). The authors also reported that the Prospects service cost £18 for each extra week of employment. Sensitivity analysis found that an increase in intervention costs by 40% took the ICER to £19,000 per QALY, while a decrease of 10% led to supported employment dominating usual care. These figures compare favourably to NICE's usual cost-effectiveness threshold of approximately £20,000 to £30,000 per QALY.

One RCT, one nRCT and one one-group study found that supported employment and internships had a significant positive effect on employment status (total number of participants N=99). One nRCT found that supported employment had a significant positive effect on earnings, and one one-group study found a non-significant positive effect (N=59). One one-group study found that supported employment had a non-significant negative effect on job performance and job satisfaction (N=9).

One nRCT found that supported employment had no effect on self-esteem, and one one-group study found that specialist training had mixed effects on quality of life and wellbeing (N=75).

One RCT (N=50) found that a digital support device significantly reduced the amount of job coaching required among people using employment support services.

See Figure 4 for a summary of these findings.

One economic study found that supported employment had an ICER of £5,600 or £1,467 per QALY. One economic analysis found that supported employment has a cost per job found of between £4,281 and £6,542.

Overall, the evidence on employment support was heterogeneous and of mixed quality, and allows only tentative conclusions. Two controlled studies and one uncontrolled study[25, 33, 43] found supported employment or internship programmes to be effective in increasing employment status. One economic analysis[14] found supported employment to be cost-effective by NICE standards. Two studies found that supported employment also increased earnings.[25, 33] These studies provide indicative evidence that specialist employment services can bring about improvements in employment-related outcomes. However, the findings on broader outcomes suggest that these interventions are not effective in increasing self-esteem[33] or quality of life or wellbeing,[20] although the latter study observed some improvements during participants' employment after the end of the intervention proper.

Many of these interventions appear to have involved substantial resources largely due to the intensive nature of the support provided. In two studies of supported employment, participants received around 30 to 50 hours of support each in the first month,[22, 33]

[‡] The higher ICER comes from the journal article[14] and the lower from the report submitted to NICE.[52] The two reports have the same utility gain figures but somewhat different cost figures, which accounts for the difference in the reported ICERs. The reason for this discrepancy cannot be determined from the reports.

although this then declined rapidly to around five to 15 hours in the fourth month. The internship programme implemented in one study[43] employed several specialist staff for a relatively small number of service users, and the course implemented in another[20] was nearly full-time for three months (some of which was general job training, but a substantial proportion appears to have been ASD-specific).

Cost data from the studies[14, 16, 22] suggest that supported employment programmes cost several hundred pounds per client per month. One study[14] showed that the Prospects supported employment service was cost-effective by NICE standards, but this did not demonstrate that it was cost-saving from a public sector perspective. (However, note that one further study[15] also included aspects of supported employment in an economic analysis, and is discussed under "3.2.9 Specialist multi-disciplinary teams" below.)

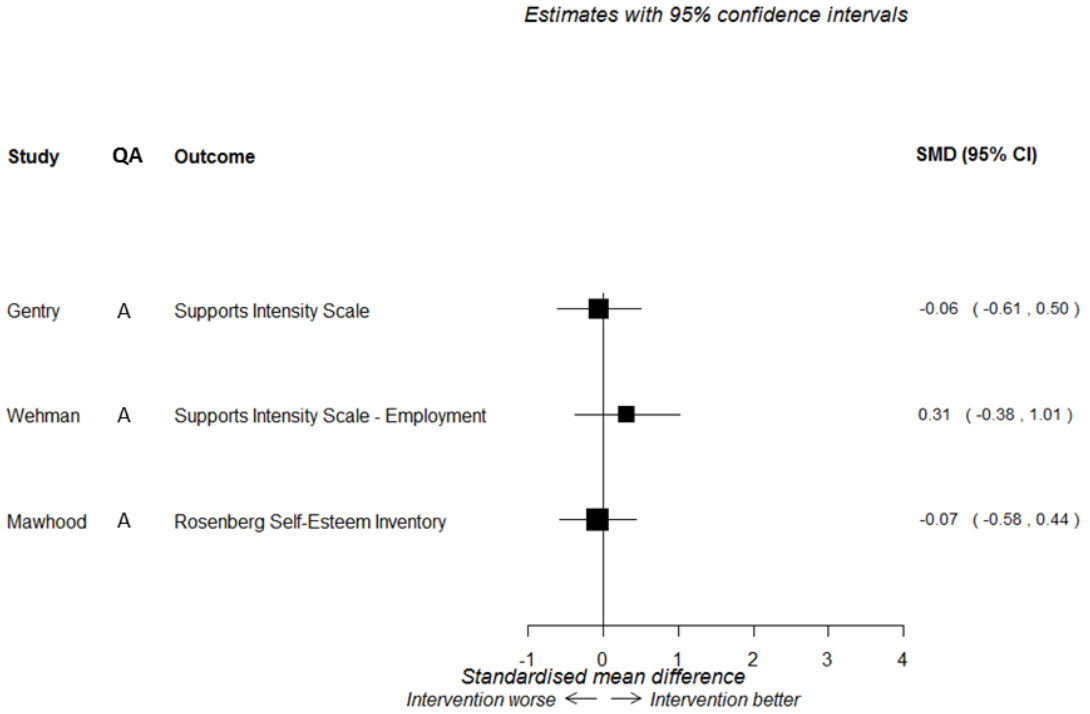

Figure 4: Forest plot: Employment support

(Note 'CI' = confidence interval)

3.2.3 Social skills training and psychoeducation

Four RCTs, two nRCTs and eight one-group studies evaluated the effects of social skills training and psychoeducation (total number of participants N=372) on autism symptoms, mental health outcomes, social support and other outcomes. Ten studies were conducted in the USA, one in the UK and three in other European countries, and most participants were male and in their twenties.

Fourteen effectiveness studies and one qualitative study evaluated some form of group social skills training or psychoeducation. Most interventions drew upon a range of

strategies and components, from didactic education to more open-ended and facilitative approaches. The review did not locate any economic analyses of this type of intervention.

One study[23] (A) compared two interventions, a group cognitive-behavioural therapy (CBT) programme and a leisure programme, for adult psychiatric patients with ASD as well as other mental health conditions. While the leisure intervention was more directly relevant to this review, the CBT intervention also met the criteria, insofar as it included a substantial psychoeducational component and was not focused on treating a particular problem. The study was conducted in Sweden and there was an almost equal split between male and female participants, with a mean age of 32 years. Participants' psychiatric co-morbidities included depression, anxiety, and attention deficit hyperactivity disorder. The CBT programme consisted of 36 weekly sessions of three hours each, with sessions focusing on ASD symptoms, social skills, and cognitive-behavioural techniques, such as goal-setting. Each session included a review of homework assignments, an educational lecture, relaxation or mindfulness, and discussions and exercises. The leisure intervention was much less structured, with direction provided by a psychiatric nurse assistant and a social worker. Participants suggested group activities that they would enjoy, such as visiting museums, playing games, walks and so on. The leisure intervention was intended to be an attention control, and limited detail was available from the published report.

The study used a randomised trial design, comparing the CBT intervention with the leisure programme. Participants completed all outcome measures at the end of the intervention (36 weeks from baseline), including: Quality of Life Inventory; Sense of Coherence scale (Antonovsky); Rosenberg Self-Esteem Scale; Symptom Checklist 90; Autism Quotient; Beck Depression Inventory; Adult ADHD Self-Report Scale; and Clinical Global Impression Scale - Severity. In addition, the Quality of Life Inventory only was measured at another follow-up a further eight to 57 weeks after the end of the intervention. The study found no significant differences between the two intervention groups on any outcome, and no significant pre-post differences for the whole group pooled together, other than on quality of life, which did significantly improve.

One study[32] (A) evaluated the UCLA PEERS social skills programme for young adults with ASD. The study was conducted in the USA and three-quarters of participants were male, with a mean age of 20 years. The programme implemented in this study consisted of 16 weekly 90-minute sessions, with participants and their caregivers attending parallel sessions. Teaching methods included 'Socratic' questioning, didactic lectures, roleplay demonstrations (to model appropriate behaviour), exercises, and feedback. Topics included conversational skills, making friends, humour, bullying and peer pressure, conflict and dating.

The study used a randomised trial design, with a wait-list control group. Outcome measures included the Social Responsiveness Scale (SRS), the Social Skills Rating System (SSRS), the Quality of Socialization Questionnaire and the Empathy Quotient; all were reported by caregivers only, except Quality of Socialization which was reported by both participants and caregivers. Participants were followed up at the end of the 16-week programme and then after a further 16 weeks. At the first follow-up, intervention participants improved significantly more than controls on one of three self-reported

Quality of Socialization subdomains (two of three caregiver-reported); on total SRS score and four of seven subdomains; and on three of five SSRS subdomains. Intervention and control participants did not differ significantly on the Empathy Quotient. Most of the gains observed in the intervention group were sustained at the second follow-up.

One study[21] (A) also evaluated the UCLA PEERS programme, a social skills training programme for young people with ASD (the same programme as the previous study[32]). The study was conducted in the USA and 71% of participants were male, with a mean age of 20 years; approximately two-thirds had a diagnosis of Asperger's Syndrome. The programme consisted of 14 weekly sessions, led by two psychologists, in groups of nine to 10 people. Session content focused on conversational and communication skills, finding friends, humour, dating etiquette, and managing arguments. Material on social rules was presented in a 'Socratic' format, with exercises and feedback, as well as didactic lessons. Participants' parents or caregivers were provided with assistance on social coaching.

The study used a randomised trial design, with a wait-list control group. Participants were followed up to the end of the intervention, approximately 14 weeks from baseline. Outcome measures included the SRS, the SSRS, the Social and Emotional Loneliness Scale for Adults, the Empathy Quotient, and the Quality of Socialization Questionnaire (all reported by caregivers except the third, which was self-report). The study found that the intervention group improved significantly more than controls on all these outcomes.

One study[42] evaluated a social-cognitive group intervention for adults with HFA. The study was conducted in the USA and participants had a mean age of 36 years and mean IQ of 112; all but one were male. The intervention consisted of 18 weekly group education sessions, with a focus on emotion training, distinguishing socially relevant facts, and making guesses about social cues.

The study used a randomised trial design, with a treatment-as-usual control; some participants in both groups accessed other services (including job coaching and individual therapy), but no other group programmes. However, after randomisation, two participants who did not wish to undertake the intervention were reassigned to the control group, so the authors agreed it could not be called a true RCT design. The outcomes were the Social Communication Skills Questionnaire and the Social Skills Performance Assessment, a rating of social skills performance based on an audio-taped roleplay. This study found no significant effect of the intervention on either outcome, although the effect on the Social Communication Skills Questionnaire was nearly significant ($p<0.10$).

One study[17] (A) evaluated a group interpersonal problem-solving course for people with Asperger's Syndrome, focusing on increasing adaptation to the workplace. The study was conducted in Spain and most participants were male and aged between 16 and 29 years, with a mean IQ of 96. The intervention included 10 weekly sessions led by a therapist, with a focus on developing conversational skills, understanding points of view, and generating solutions to interpersonal problems. The sessions included a didactic component, sharing of personal experiences, and homework.

The study compared an intervention group of people with Asperger's Syndrome to a comparison group drawn from the general population without ASD (outcomes for the comparison group were measured at one time point only and effect sizes analysed on this

basis). Outcomes included the Vineland Adaptive Behavior Scale – Social (reported by parents); an assessment of social problem-solving (Evaluación de Solución de Conflictos Interpersonales); and an assessment of work capabilities (Osnabrück Ability to Work Profile, reported both by participants and by supervisors). The study found a significant effect of the intervention on the Vineland Adaptive Behavior Scale total score and all three subdomains; and on the Evaluación de Solución de Conflictos Interpersonales total score and two of three subdomains. There was no significant effect on the Osnabrück Ability to Work Profile.

One study[36] (A) evaluated a leisure programme for young adults with ASD. The study was conducted in the Netherlands and most participants were male, with a mean age of 21 years. The programme consisted of 15 sessions of approximately 2.5 hours each, over six months, initially weekly then becoming less frequent. Teaching strategies were based on cognitive-behavioural principles and included examples of cues and stimuli, behavioural practice, lifestyle analysis and feedback, with homework exercises.

The study used a non-randomised controlled design, with a no-intervention control, with allocation based on order of recruitment. Participants were followed up at one to two weeks after the end of the intervention (six months from baseline). The outcomes were three self-reported questionnaire instruments developed specifically for the study, designed to measure need for leisure support, engagement in leisure activities, and satisfaction with leisure. The study found that intervention participants improved non-significantly more than controls on all three outcomes; significant within-group pre-post changes were observed in the intervention group on all three outcomes.

Two studies[24, 26] (both C) evaluated the 'Aspirations' social and vocational skills support group for young adults with ASD, apparently with different groups. Both studies were conducted in the USA and most participants were male, with a mean age of 19 years in one study and 21 years in the other; the majority had a diagnosis of Asperger's Syndrome. The intervention included eight weekly one-hour meetings, with between five and seven participants and two facilitators per group. Sessions were mainly focused on general social skills and experiences. Interaction between group members was conceived as the core of the approach, with participants sharing their own experiences and creating problem-solving strategies, rather than intervention providers taking a didactic approach (however, the actual content of sessions seems to have been determined in advance rather than by participants). Topics included employment, friendships and interpersonal problem-solving, and communication. There were also regular social reunions after completion of the programme, although these were outside the period of the study.

Both studies used an uncontrolled one-group design and followed up participants until the end of the intervention (eight weeks). In one study[24] outcome measures included the Index of Peer Relations, Autism Spectrum Quotient and Empathy Quotient. The study found no significant pre-post changes in the Index of Peer Relations and the Autism Spectrum Quotient, but participants did significantly improve on the Empathy Quotient. In the other,[26] outcome measures were the Index of Peer Relations, the State-Trait Anxiety Inventory, and the Beck Depression Inventory. This study found a significant pre-post improvement in depression and anxiety, but again not on the Index of Peer Relations.

One study[18] (A) evaluated an education programme focusing on romantic relationships, comparing the standard version of the programme with one specially adapted for adults with ASD. The study was conducted in the USA and most participants were male and aged between 18 and 29 years, with 71% having at least some college education. The programme was conducted over eight weekly sessions of two hours each, with content focusing on communication, conflict management, and dealing with change. Adaptations for ASD included the addition of specially designed components on social skills relating to starting conversations, flirting and dating.

The study used a non-randomised controlled design, with allocation based on convenience, comparing the standard programme with the ASD-adapted one. However, most of the data were only reported as single-group pre-post results on the pooled sample, so the study is counted here as one-group. Outcomes included the SRS, the Autism Spectrum Quotient, the Dating and Assertion Questionnaire (two domains), the Empathy Quotient and the Social Provisions Scale. Participants were followed up to the end of the intervention programme, eight weeks from baseline. The pooled pre-post analysis found significant improvements on the SRS, Dating and Assertion Questionnaire - Dating domain and Empathy Quotient, but not on the Autism Spectrum Quotient, Dating and Assertion Questionnaire - Assertion domain or Social Provisions Scale. The author reported that no significant differences were found between the two intervention groups, but full supporting data were not included in the report.

One study[19] (B) evaluated a 'cognitive enhancement therapy' intervention; while the focus of this study was on cognitive outcomes (which were not included in this review), the intervention also contained elements of social skills training. The study was conducted in the USA and most participants were male, with a mean age of 25 years and mean IQ of 118; 86% had at least some college education. The intervention consisted of a first phase of 60 hours of purely cognitive training (not discussed here), followed by a 45-session programme of social-cognitive education. Topics in the latter included social interactions, perspective-taking and managing emotions, and the strategies used included roleplay exercises with group feedback, didactic lectures, and homework assignments. Session content appears to have been highly structured and focused on solving narrowly defined social problems, rather than on social functioning in any broader sense.

The study used an uncontrolled one-group design. As noted, most of the study outcomes were cognitive and outside the scope of this review, but one set of questionnaire outcomes, the Cognitive Style and Social Cognition Eligibility Interview, was relevant. This instrument included subdomains of 'vocational ineffectiveness' ("current employment, school, and household activities"), 'interpersonal ineffectiveness' ("the quality and quantity of interactions with friends and family members") and 'adjustment to disability' ("knowledge of autism and the ability to adapt to its challenges") (pp2869-70). Participants were followed up until the end of the intervention programme, at 18 months from baseline. The study found that all three subdomains – vocational ineffectiveness, interpersonal ineffectiveness and adjustment to disability – improved significantly from baseline to post-test.

One study[28] (C) evaluated a social skills programme for adults with ASD. The study was conducted in the UK and all participants were male, with a mean age of 28 years and a

mean non-verbal IQ of 109. The intervention consisted of monthly meetings over one year, each around 2.5 hours long, including group discussion of experiences and a focused session on problem-solving. Teaching strategies included roleplays, team activities, and feedback from video recordings of the sessions. The topics focused on conversational skills, emotions, assertiveness and stressful situations, with a session on job interviews.

The study used an uncontrolled one-group design. Participants were followed up at the end of the programme (one year). The outcome measures were ratings of social skills in the context of two roleplays, one involving chatting to a guest at a party and the other a mock job interview. Participants' speech in these scenarios was coded on several domains, including the percentage of appropriate and inappropriate responses. The study found that in the party scenario, participants improved significantly from baseline to post-test on conversation-maintaining and -initiating utterances, but not on the percentage of appropriate or inappropriate responses. In the job enquiry scenario, participants improved significantly on the percentage of appropriate and inappropriate responses, but not on information-giving or -requesting utterances and not on social utterances.

One study[29] (C) evaluated a social skills training programme for young people with ASD, which used a virtual reality environment. The study was conducted in the USA and three-quarters of participants were male, with a mean age of 21 years and mean IQ of 112. The intervention was a manualised programme of social cognition training undertaken in Second Life, using avatars for coaches and participants. Participants undertook 10 training sessions on a one-to-one basis with a clinician acting as coach, with feedback for each session. Topics focused on specific social situations, such as meeting people, job interviews, negotiating with a salesman and dating.

The study used an uncontrolled one-group design. Participants were followed up until the end of the intervention programme (five weeks). The outcome measure consisted of performance in video-recorded roleplay conversation, rated for social skills (several cognitive instruments were also used, but fall outside the scope of this review). The study found that participants' social skills improved near-significantly from baseline to post-test.

One study[37] (C) evaluated a 'problem-solving therapy' intervention for college students with ASD. The study appears to have been conducted in the USA, and all participants were male, with a mean age of 21 years and mean IQ of 128. The programme, led by two graduate students in clinical psychology, appears to have had a fairly narrowly focused didactic approach, with strategies including feedback on social skills, direct instruction and modelling, and roleplays. The authors stated that the problem focus was selected by participants, but did not report any further detail. The programme consisted of nine sessions.

The study used an uncontrolled one-group design. Participants were followed up at the end of the nine-week programme and then again after a further two months. The outcome measures were the Social Problem Solving Inventory Revised, Long Form (SPSI), and the Outcome Questionnaire (OQ, a general mental health outcome measure). Participants showed some improvement at the first follow-up on both outcomes, which was partly sustained at the second follow-up; the authors did not report standard measures of statistical significance, but suggested that the 'reliable change indices' showed clinically

significant outcomes for two of five participants on the SPSI at both time points, for two of five on the OQ at the first follow-up, and for none on the OQ at the second follow-up.

One study[44] (C) also evaluated the PEERS social skills intervention for young adults. The study was conducted in the USA and all participants were male, with a mean age of 24 years and mean IQ of 92; the majority had a diagnosis of Asperger's Syndrome. As with the other studies of PEERS described above,[21, 32] the intervention focused on building skills related to interpersonal relationships using didactic teaching, roleplay with feedback, and homework exercises, with a parallel course for caregivers. The intervention in this study was delivered by student clinicians.

The study used an uncontrolled one-group design. The outcome measure was the Contextual Assessment of Social Skills, a roleplay assessment of social skills, which was videotaped and rated by trained, blinded researchers. The study found changes in a positive direction across all four core domains of the outcome measure, but statistical significance was not assessed.

One qualitative study[46] assessed a programme for young adults with HFA and Asperger's Syndrome, which focused on increasing self-determination. The study was conducted in the USA. Participants were aged between 16 and 28 years, with an almost equal number of women and men. The programme consisted of 10 sessions of two to three hours each, with content including social skills and communication, organisation, experiences of autism, and life planning and goal setting.

Participants and, in some cases, their parents (who were not informed of the detailed content of the programme) were interviewed to assess the perceived impact of the intervention; most of the data were provided by parents. Students expressed generally favourable views of the course, and said that meeting other people with HFA had been valuable. Parents reported perceived impacts in terms of improved coping strategies; insight into oneself and into the impact of autism; conversation skills; goal-setting; and independent behaviour.

Two RCTs and two one-group studies found that social skills training had significant positive effects on autism symptoms or empathy (total number of participants N=90). One one-group study found that social skills training had significant positive effects on depression and anxiety, and one further one-group study found a non-significant positive effect on general mental health (N=54). Two RCTs and one one-group study found that social skills training had significant positive effects on social support or quality of socialisation; three further one-group studies found non-significant positive effects (N=153). One one-group study found that social skills training had a significant positive effect on observed social behaviour; two further one-group studies found non-significant positive effects; one RCT found a non-significant adverse effect (N=34). Two RCTs and one nRCT found that social skills training had significant positive effects on social skills; one further RCT found a non-significant positive effect (N=150).

One nRCT found that a leisure lifestyle intervention had non-significant positive effects on outcomes related to leisure (N=12).

One RCT found that group CBT and a recreational activity intervention did not significantly differ in their effect on autism symptoms, quality of life, and mental health outcomes (N=68).

See Figure 5 for a summary of these findings.

Overall, the evidence on social skills training and psychoeducation was of variable quality, with a few robust trials, but much of the evidence was of low quality. The results do not allow any strong conclusions to be drawn, although there were some promising findings for particular outcomes. There was reasonably strong evidence with respect to questionnaire measures of autistic symptoms and social skills, particularly from the two randomised trials of the PEERS programme;[21, 32] however, uncontrolled and pilot studies of other social skills programmes showed less unequivocally positive results.[17, 24, 37, 42] Measures of observed social skills showed mixed results;[28, 29, 42, 44] as with the job interview performance outcomes (above), the measures used were somewhat idiosyncratic. The outcomes regarding social support or satisfaction with socialisation were mixed: RCTs and nRCTs showed improvements on loneliness,[21] mixed findings on quality of socialisation,[32] and no significant changes on leisure-related outcomes;[36] single-group studies showed some positive results[18, 19] but two failed to find a significant effect.[24, 26] Evidence on mental health and wellbeing outcomes was inconclusive:[23, 26, 37] while two non-comparative studies showed positive trends,[26, 37] the most robust study to measure these outcomes largely suggested that the programme evaluated was not effective, although it did observe a non-comparative improvement in quality of life;[23] however, this study focused on people with psychiatric comorbidities.

The interventions varied with respect to intensity, with some including sustained contact over several months[19, 23] and others being relatively brief. Most used group designs with one or two group leaders or facilitators; in many studies the latter were highly trained and experienced. Many of these interventions were strongly interactive, and positive outcomes may well represent an element of group support as well as the content explicitly described in study reports. In most cases, the content and structure appear to have been largely determined by the researchers or programme staff; while participants' input appears to have been solicited within the sessions, in most cases, they probably had little influence over the broader direction or goals of the programmes.

As with the employment-related interventions, most of these programmes were aimed specifically at young adults, with the mean age in most studies in the early or mid-twenties; it is unclear whether these findings would generalise to older participants. There was limited information on sampling or recruitment for many of the studies: a few reported purposively selecting participants for their desire and motivation to engage with the intervention, and this was probably a factor even where it was not reported explicitly. Because of this, the study results may not generalise to the broader ASD population.

A strength of this group of studies is that most used standardised psychometric outcomes, which had been validated, at least on the general population. However, the bulk of these consisted of self-reports of participants' attitudes or behaviour, and it is unclear how far such outcomes are likely to generalise to improved functioning or wellbeing. The findings relating to social support, quality of life and mental health were inconclusive.

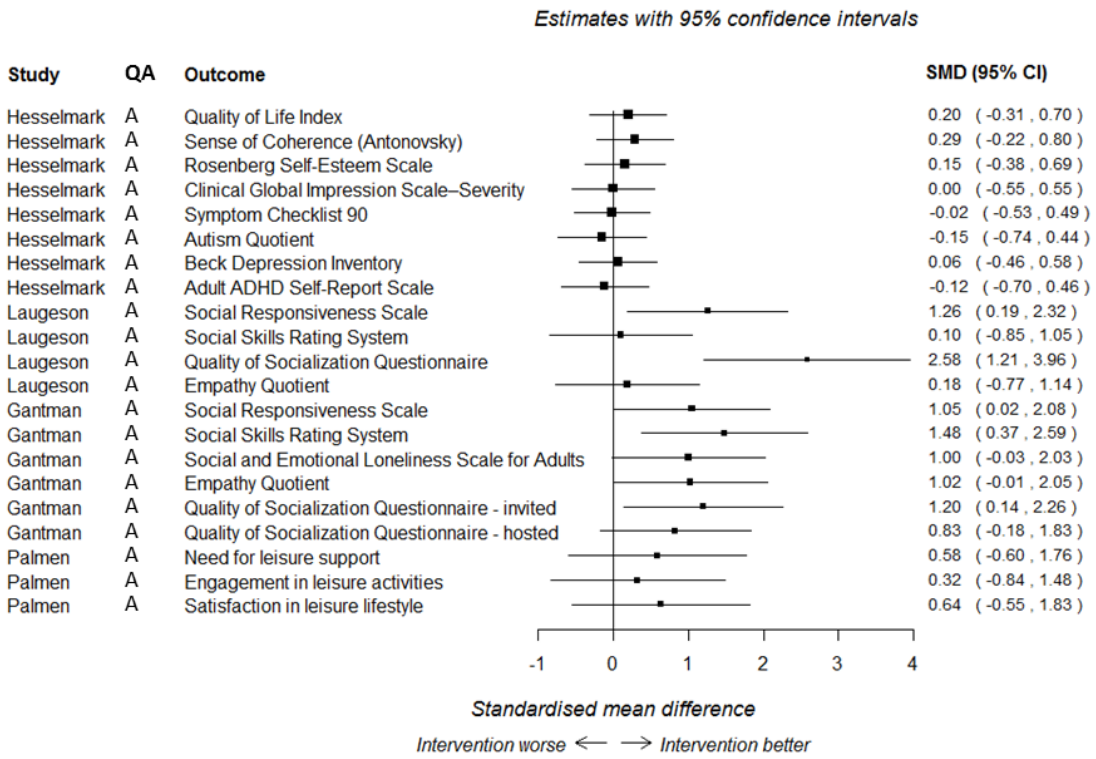

Figure 5: Forest plot: Social skills training and psychoeducation

3.2.4 Music and dance interventions

One nRCT and one one-group study evaluated the effects of music and dance interventions (total number of participants N=53) on a range of outcomes. One study was conducted in the USA and one in Germany, and most participants were male and in their teens or early twenties.

Two effectiveness studies and one linked qualitative study evaluated music or dance interventions (one music therapy, and one dance and movement). These programmes aimed to improve participants' social relations and wellbeing through creative interaction.

One study[30] (A) evaluated a dance and movement programme for young adults with ASD. The study was conducted in Germany, and three-quarters of participants were male, with a mean age of 22 years. The programme, led by a trained movement therapist for seven weekly sessions of one hour each, focused on mirroring exercises, whereby participants reflected each other's movements, along with verbal discussion of their feelings.

The study used a non-randomised controlled design, and reported that participants were matched by age, gender and severity of autism symptoms (although full data were not reported); the control group received no intervention. Participants were followed up at the end of the seven-week programme. Outcome measures were the Heidelberger State Inventory (a measure of wellbeing), the Questionnaire of Movement Therapy (two subdomains: body awareness and social skills), a specially constructed instrument measuring 'self-other awareness', and the Emotional Empathy Scale. The study found that

intervention participants improved more than controls on all of these outcomes, except empathy.

One study[27] (C) evaluated the 'SoundScape' programme for young adults with ASD. The study was conducted in the USA, and most participants were male, with a mean age of 18 years; three-quarters had a diagnosis of Asperger's Syndrome. The intervention was a group music programme facilitated by music-education and psychology students. It focused on exploring sound, and composing and improvising music, particularly using computers and music-production software.

The study used an uncontrolled one-group design. Participants were followed up until the end of the programme (eight weeks). Outcome measures were the Index of Peer Relations (IPR), Rosenberg Self-Esteem Scale, and State-Trait Anxiety Inventory (all reported by participants, and IPR also by parents or guardians). The study found that participants improved significantly on all these outcomes.

Qualitative data, mainly from programme staff (student assistants), were available in a separate report.[47] This study found that staff perceived the intervention to be useful for participants' social interaction and self-confidence, and that most staff were enthusiastic about the programme. The data from open questions on a questionnaire distributed to participants and parents also showed that the intervention was positively perceived, both for the creative content and learning involved, and the opportunity for social interaction.

One nRCT found that a movement-therapy intervention had significant positive effects on wellbeing, anxiety and quality of socialisation, and a non-significant positive effect on empathy (total number of participants N=31). One one-group study found that music therapy had significant positive effects on peer relations, self-esteem and anxiety (N=22). See Figure 6.

Overall, there is a limited amount of evidence on music and dance interventions. However, one fairly robust study found evidence for the effectiveness of movement therapy on wellbeing and social skills. The interventions were generally fairly brief. As with the other categories, most participants were young adults.

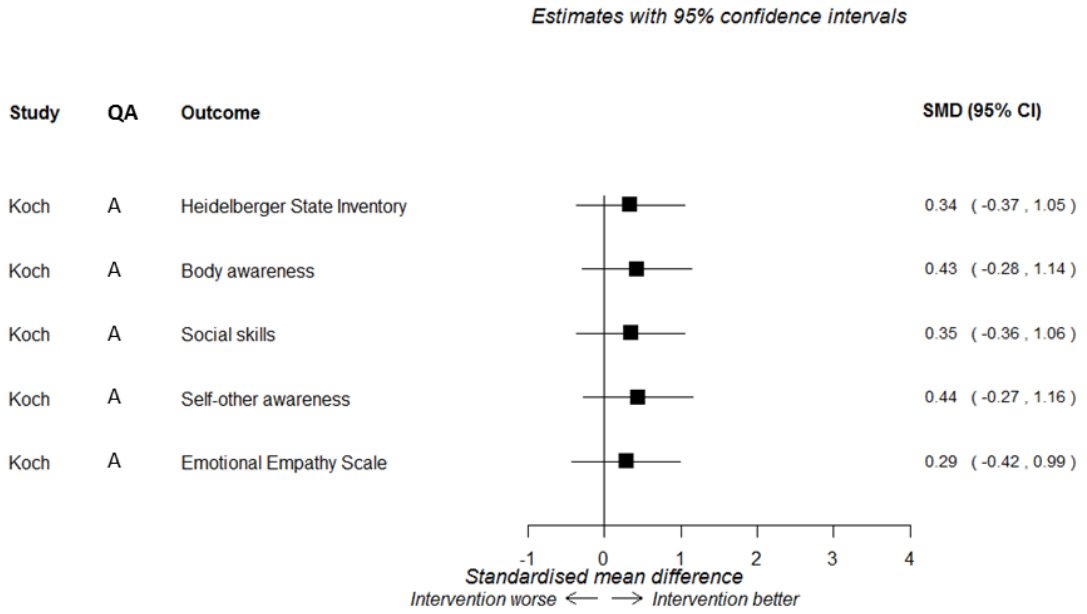

Figure 6: Forest plot: Music and dance interventions

3.2.5 University student support and mentoring

Two one-group studies evaluated support and mentoring interventions for university students (total number of participants N=6) on social activities and academic attainment. Both studies were conducted in the USA, and most participants were male and in their early twenties.

Two effectiveness studies and one qualitative study considered support interventions for university students. (One other study[37] also sampled university students, but that study is included under "3.2.3 Social skills training and psychoeducation" above.) The interventions in this category had a focus on one-to-one mentoring, and aimed to improve academic performance, as well as functioning more generally.

One study[31] (C) evaluated an intervention that focused on social planning and directly increasing social interaction. The study was conducted in the USA and all participants were male and had a diagnosis of Asperger's Syndrome. The mean age was 22 years, and all were university students receiving specialist services. The intervention consisted of weekly sessions, with a clinician, which initially aimed to identify social activities suited to participants (e.g. clubs, organised social events, or events at community sites) and teach relevant organisational skills. Participants were then assigned a neuro-typical peer mentor, where necessary, to attend social events, and in subsequent meetings discussed their experiences and any problems with social interaction. Support was then faded out over time.

The study used an uncontrolled one-group design. Participants were followed up over 24 weeks of support and then for a further five to six weeks. Outcome measures included the number of social activities engaged in (reported for each participant as raw data by week), academic performance (grade-point average) and a questionnaire assessing participants' satisfaction with socialisation. Statistical significance was not assessed in this

study. The study found that participants engaged in more social activities during the intervention period and the subsequent follow-up than at baseline: no participant engaged in any social activities at baseline, while the number in subsequent periods ranged up to approximately 18 activities per week. Participants' academic grades and their satisfaction with socialisation also improved.

One study[35] (B) evaluated a peer-mentoring programme for college students with Asperger's Syndrome, which focused mainly on academic performance. The study was conducted in the USA. Participants were assigned a mentor who was a student in communication sciences and disorders; the mentors received specialist training. The programme focused on needs assessment, goal setting and development of strategies. Participants met their mentors once a week for an hour to develop goals and strategies and discuss any problems.

The study used an uncontrolled one-group design. The only outcome measured was grade-point average. Participants were followed up for one semester. The study found no substantial change in participants' grade-point average after the intervention; significance was not reported.

This study also reported a small amount of qualitative data from participants who generally felt the intervention had been helpful. The structure and consistency promoted by the programme, and the personal aspect of mentoring, were identified as useful components.

One qualitative study[45] conducted a process evaluation of two support services for students with HFA or Asperger's Syndrome in the USA. Both programmes employed some full-time staff and part-time assistance to provide mentoring. Both charged individuals for their services: one, at a public university, cost US $3,200 per semester and the other, run by a private for-profit company, cost US $33,500 per year plus a US $1,500 joining fee. The former focused mainly on mentoring individuals, with graduate students meeting service-users on a daily basis to offer assistance with academic work, scheduling and daily living issues; they also liaised with academic staff to ensure individuals' needs were met. The programme organised social and leisure groups, as well as a mandatory social skills programme ('discovery groups'). The latter offered a substantial amount of one-to-one specialist academic tutoring, as well as extensive support on independent living skills, and a programme of social activities; a programme of group education was provided with a focus on social skills and managing emotions.

This study interviewed only programme staff and did not collect data from service users; the data were primarily descriptive in nature. The study found that staff perceived that a major determinant of the programmes' success was the highly individualised nature of the programme which made it responsive to students' needs. However, staff also perceived this individualised, in-depth support to be highly intensive in terms of time and effort. Participants frequently identified the importance of goal setting and futures planning as part of the support offered by students, as well as practical issues to do with life skills or time management. Working with academic staff to ensure that they understood students' needs was identified as an important component of the programme. Some participants also mentioned other needs that may need to be addressed, for example issues around

alcohol or drugs. The main benefits perceived by staff were in the areas of social interaction and independent living.

One one-group study found that a social planning intervention for university students had non-significant positive effects on social activities (N=3). Two one-group studies found mixed results regarding the effect of interventions for university students on academic grades (N=6).

Overall, the evidence on university student support is inconclusive. The intervention studies were both very small, used uncontrolled designs and did not report the statistical significance of the findings, and the qualitative study also had some methodological limitations. While qualitative evidence suggests that these programmes were positively perceived by staff, the evidence does not support conclusions regarding effectiveness.

All the evidence came from the USA and may be of limited generalisability to the UK context, because of different institutional settings. The use of one-to-one mentoring means that all these programmes were probably somewhat intensive. Both the programmes discussed in Ford's study[45] provided highly intensive support, and charged service-users substantial fees.

3.2.6 Safety interventions

One one-group study evaluated the effects of road safety training (N=7) on safety behaviour and knowledge.

One study[38] evaluated an intervention specifically focusing on safety. This study (C) evaluated a virtual reality environment for teaching road safety skills to adults with ASD. The study was conducted in Italy and participants had a mean age of 29 years and mean performance IQ of 83 (three of seven participants had an IQ of less than 70, so the study was close to the borderline for inclusion in this review). The intervention consisted of a virtual reality environment and a Kinect motion capture device, which was used to teach participants road crossing skills. Errors, such as crossing against the light or outside the crossing, triggered an acoustic alarm. Participants completed 10 weekly sessions.

The study used an uncontrolled one-group design. Outcomes were the incidence of three types of error, as measured by the application, a questionnaire assessing knowledge of road safety, and a questionnaire for parents or caregivers. The study found that there was statistically significant pre-post improvement on one of three error types, and on the parent/caregiver questionnaires, but not on the test of participants' knowledge.

One one-group study found mixed effects of road safety training (N=7) on safety behaviour and knowledge.

3.2.7 General support

Two qualitative studies focused on services providing general support to adults with HFA, with a broad goal of improving health and social functioning, developing independent living, and reducing the use of specialist services. Along with peer support groups (see next section), these interventions most closely resembled the approaches described in the 2014 Adult Autism Strategy. Both studies were conducted in the UK. No effectiveness and

no cost-effectiveness evidence was located on this type of programme, and both qualitative studies have serious methodological limitations.

One qualitative study[50] considered the 'No. 6' one-stop shop for adults with HFA and Asperger's Syndrome in Edinburgh. This programme aimed to provide a general support service and provide referrals and signposting to other services (including an employment support service). They also ran a wide range of social activities and support groups.

The study collected views data from programme staff, service-users and their parents and carers. Service-users and parents perceived the most important benefits to come from increased opportunities to interact socially and meet new people. They valued the sense of being understood and 'at home', and the helpful and non-judgemental attitudes of staff. The availability of advice and skills training was also appreciated. Staff felt that liaising with other professionals, and a single point of contact for service-users, were important contributions.

One qualitative study[51] considered the Warwickshire Adult Autism and Asperger Support Service. The focus was to evaluate the feasibility of extending the service to 16- to 18-year-olds, but data were also collected on the service provided for adults over 18 years. The service was designed to offer general support to people with HFA, who did not meet Fair Access to Care criteria. The programme had four main goals: managing anxiety and depression; accessing the community; employment and benefits; and developing independent living skills.

Data were collected from both programme staff, and service-users and their parents or carers. However, most of the data presented the perceptions of programme staff. Participants felt that the service's focus on 'enabling' people was key to its sustainability. Limited funding was seen as a barrier to successful delivery, although programme staff had been creative in finding ways around the lack of resources. Many of the components felt to be valuable were everyday forms of help, such as assistance with food shopping, or just knowing that someone from the service was available to talk to. Liaison with other services was seen as helpful. Positive outcomes were perceived across a range of areas, including independent living and employment.

While there is no outcome evidence on these services, and the qualitative research has limitations, it provides an indication of the potential value of general support services. These interventions were generally not intensive in terms of time or resources. It is likely that they served a population which was considerably more diverse than the samples seen in many of the effectiveness studies.

3.2.8 Peer support groups

Two qualitative studies of peer support groups were found. No effectiveness and cost-effectiveness evidence was located on peer support groups.

One qualitative study[48] explored the views and experiences of adults with Asperger's Syndrome who either participated in peer support groups or were seeking to join such a group. The study was conducted in the USA, and most participants were older adults (generally aged 40 to 60 years) with a high level of education. The groups studied were informal discussion groups led by professional facilitators, in which participants could

interact informally and share their experiences. The study found that participants valued the opportunity for social interaction provided by the groups, and emphasised the importance of both receiving and giving support, sharing experiences and seeing "how other people cope". The groups were also seen to provide structure and fill free time. Several participants also mentioned that family members or professionals had encouraged them to take part. Of the participants who were not yet in a group, some expressed fears about participation, including having to share private feelings or being judged. Participants emphasised the importance of all group members having a chance to speak. Several also suggested that more social activities would be a good way to extend the group experience.

One qualitative study[49] used a N=1 case study design of a participant in a support group for adults with Asperger's Syndrome (who was a co-author of the study). The study was conducted in the UK, and the participant was a woman who joined the group aged 52 years, shortly after receiving a diagnosis of Asperger's Syndrome. The group met monthly, and had 10 to 15 participants and three co-ordinators who planned the sessions; membership was closed (i.e. it was not a drop-in group). The sessions included a structured element, in which each individual shared recent experiences or problems, followed by an opportunity for informal socialising.

The one participant studied appreciated hearing about how other group members had similar difficulties to her, and having an opportunity to socialise informally. She also spoke of the sharing of experiences as "tak[ing] away the guilt you might feel for what has happened in the past", by enabling a better understanding of one's behaviour.

As with the previous category, there is no outcome evidence on peer support and the qualitative research is limited both in extent and quality. Nonetheless, it indicates that participants perceived that such programmes were beneficial, although there may be barriers to taking part. While not highly intensive, there was substantial staff input: facilitator to member ratios ranged from 1:7 to 1:3, and at least in one case the facilitators were qualified professionals.

3.2.9 Specialist multi-disciplinary teams

One economic analysis of specialist multi-disciplinary support teams was located[15] and it conducted cost-effectiveness modelling to evaluate the impact of a specialist multi-disciplinary support team for adults with HFA or Asperger's Syndrome in England. The service was taken to include diagnostic assessment along with coordination of other services, including, for example, therapeutic interventions and employment support. The service was based on existing services offered in three areas (Liverpool, Kingston and Northamptonshire), although details were limited and only the Liverpool Asperger Syndrome Team was identified by name. It appears that at least two of these services were based in the NHS and largely staffed by clinical professionals (psychologists, nurses, occupational therapists etc.). The report described the Liverpool service as follows: "Clients do not require a formal diagnosis of Asperger Syndrome to be referred to the service, as the team also carry out diagnostic assessments. Acting as a central point of access from assessment and diagnosis, the team provides its clients with ongoing care management and co-ordinates a range of other services, including employment support, education, service-user and carer groups, mental health, criminal justice liaison and

alcohol/substance misuse services" (p37). It should be noted that the programme studied, though similar to that recommended by NICE guidance, was arguably tangential to low-level interpersonal support in the narrower sense. While the Adult Autism Strategy appears to include facilitating access to statutory services as one aspect of "low level interpersonal support", it does not explicitly outline the relationship between low-level interpersonal support and specialist multi-disciplinary teams.

Several types of benefit of these services were modelled: increased rates of diagnosis; use of crisis services, health services and residential care; increased earnings from employment; and reduced losses of employment and expenses for carers. This study (unlike Mavranezouli et al.'s[14]) did not attempt to model utility gains as a result of the intervention, but focused on cost savings to the public sector and to private individuals.

The study found an 80% chance that the intervention was cost-saving overall. The base-case analysis, in which identification rates were increased to 4%, was found to produce a net benefit to the public sector of £200 per 1,000 working-age people (95% CI -900 to 1800) and a benefit to private individuals of £200 (95% CI 100 to 500). The benefit to the public sector was shown to break down as a cost of £100 to the DWP (95% CI 0 to 300), a benefit of £1,100 to local authorities (95% CI -100 to 3,000), and cost of £800 to the NHS (95% CI 700 to 900). If this hypothetical effect were generalised across England as a whole, then in the long run, the public sector would save a total of £6.4 million per year (comprised of a £25.4m cost to the NHS, a £3.2m cost to DWP, and a £35.0m benefit to local authorities).

In sensitivity analysis, a lower identification rate (2%) was found to produce a net cost to the public sector of £700 per 1,000 working-age people, while higher rates of 8% and 14% produced net benefits of £2,100 and £5,000 respectively. These figures would correspond to a net cost to the public sector across England of £22.3m (2%), or a net benefit of £66.8m (8%) or £159.0m (14%). The model was also found to be sensitive to the probability of people receiving supported accommodation or residential care, and to the population prevalence of HFA and Asperger's Syndrome.

One economic study found an 80% probability that specialist multi-disciplinary support teams were cost-saving from a public-sector perspective, with a net saving in the base-case scenario of £200 per 1,000 working-age people.

The data used for the parameters in this model appear to be largely based on the best available evidence (although not on a systematic review). However, in many cases (as this review has confirmed) robust evidence of effectiveness was lacking. Other than for supported employment, where effectiveness data from two effectiveness studies were used, data were largely drawn from service providers' observations.

3.2.10 Outcome measures

A wide range of outcome measures was used in the studies (see the full breakdown in Appendix 7). Table 4 tabulates the categories of outcomes in the effectiveness studies against the categories of interventions. As Table 4 shows, social skills and variables related to social support or social interaction were most commonly measured. Eight of 27 studies measured outcomes relating to quality of life, wellbeing or mental health.

Table 4: Intervention categories by outcome types

	Autism symptoms / empathy	Quality of life / wellbeing	Mental health	Social support / social life	Social skills	Service use	Employment-related	Other	TOTAL
Interview training	0	0	1	0	3	0	1	0	3
Employment support	0	2	0	0	0	2	4	0	5
Social skills	5	1	3	6	8	0	2	3	14
University	0	0	0	1	0	0	0	2	2
Music/dance	1	2	1	1	1	0	0	1	2
Safety	0	0	0	0	0	0	0	1	1
TOTAL	**6**	**5**	**5**	**8**	**12**	**2**	**7**	**7**	**27**

Autism symptoms and empathy. Two RCTs and two one-group studies of social skills training found significant improvements in autism symptoms or empathy (total number of participants N=90). One RCT found that group CBT and a recreational activity intervention did not significantly differ in their effects on autism symptoms (N=68). One one-group study of a music intervention found a non-significant improvement in empathy (N=22).

Quality of life and wellbeing. One nRCT and one one-group study of employment support found a non-significant adverse effect and no effect, respectively, on quality of life and wellbeing outcomes (N=75). One RCT found that group CBT and a recreational activity intervention did not significantly differ in their effects on quality of life or wellbeing (N=68); however, there was a significant pre-post improvement for the pooled sample. One nRCT and one one-group study found significant improvements of music and dance interventions on quality of life and wellbeing (N=53).

Mental health. One RCT of job interview training found a non-significant improvement in depression (N=28). One RCT found that group CBT and a recreational activity intervention did not significantly differ in their effects on mental health outomes (N=68). One one-group study of social skills training found significant improvements in depression and anxiety, and one further one-group study found a non-significant improvement in general mental health (N=54). One one-group study of a music intervention found a significant improvement in anxiety.

Social support and quality of social life. Two RCTs and one one-group study of social skills training found significant improvements in social support or quality of social life, and

three further one-group studies found non-significant improvements (N=153). One one-group study of a music intervention found a significant improvement in peer relationships (N=22). One one-group study of support for university students found a non-significant improvement in satisfaction with socialisation (N=3).

Observed social performance. Three RCTs of job interview training found significant improvements in observed interview performance (N=76). One one-group study of social skills training found a significant improvement in observed social skills; two further one-group studies found non-significant improvements; one RCT found a non-significant adverse effect (N=34).

Social skills (questionnaires). One RCT of job interview training found a non-significant improvement in social behaviour (N=28). Two RCTs and one nRCT of social skills training found significant improvements in social skills; one further RCT and one one-group study found non-significant improvements (N=155). One nRCT of a movement intervention showed a significant improvement in social skills (N=31).

Service use. One RCT of an employment intervention shows a significant improvement in service needs; one further RCT shows mixed and non-significant results (N=90).

Employment outcomes. One RCT of job interview training shows a non-significant improvement in employment status (N=26). One RCT and one nRCT of supported employment show significant improvements in employment status and/or earnings; one one-group study shows a non-significant improvement (N=99).

3.2.11 Adverse effects

There is no evidence of any significant adverse effects (harms) on any outcome arising from any intervention type. One one-group study[25] of an employment intervention found a decline in job satisfaction outcomes from 3 months to 12 months, but this study did not report any significance tests of the findings.

3.3 Satisfaction and feasibility data

Of the effectiveness studies, 16 reported some data on satisfaction, views about the intervention, or perceived change (not including the one study which was also coded as a qualitative study). These data were collected at the end of the intervention, and are included here as they may provide useful contextual information. Most studies reported the results of surveys asking whether participants were satisfied with the intervention, or found it useful, enjoyable and so on. In all studies, participants reported positive views or experiences of the intervention. Several studies also asked participants (or their parents) for their views as to whether they had improved on specified domains (N=8). Again, all studies reported that most participants felt they had improved. However, it should be recognised that data of this sort can be misleading unless steps are taken to address potential biases, relating, for example, to respondents wanting to be seen as supportive or positive about a service (social desirability effects).

Few studies appear to have specifically solicited participants' suggestions for improvement or thoughts on specific aspects of the programmes, and none presented extensive data that might inform those who wish to develop services. One study found that participants felt "the programme should include less 'talking' and more behavioural practice",[36] and

one reported that "[r]espondents indicated that they wished that … they had more opportunity outside of the group to practice skills".[42] In six studies, participants described the opportunities for social interaction within the programme as valuable (although Mawhood and Howlin[33] found less positive results relating to making friends as a result of finding a job).

4. Conclusions

4.1 Summary of findings (effectiveness and cost-effectiveness)

- Evidence from three RCTs suggests that job interview training was effective in improving interview performance (total number of participants N=76). Evidence on other outcomes is inconclusive.
- Evidence from two RCTs, one nRCT and two one-group studies suggests that supported employment was effective in increasing employment rates and earnings (N=174). Evidence on other outcomes is inconclusive. One economic study found supported employment to be cost-effective.
- Evidence from four RCTs, two nRCTs and eight one-group studies suggests that social skills training was effective in improving self-rated social skills and autism symptoms (N=372). Evidence on other outcomes is inconclusive.
- Evidence from one nRCT suggests that movement therapy was effective in improving social skills and wellbeing (N=31).
- Evidence on mentoring and support for university students is inconclusive.
- Evidence on safety interventions is inconclusive.
- Evidence from one economic study suggests that specialist multi-disciplinary support was cost-saving from a public sector perspective.

4.2 Strengths and weaknesses of the evidence base

We identified a substantial body of research, including several good-quality studies, on support interventions for people with HFA. The most reliable and consistent evidence related to job interview training (for interview performance outcomes) and social skills programmes (for social skills and autism symptomatology outcomes). There is some evidence regarding supported employment for employment-related outcomes, but it is more heterogeneous. Evidence on other interventions is lacking: many potential intervention strategies, such as advice and advocacy, peer support groups and mentoring, lack not only reliable effectiveness data, but any evidence at all. Data from a few qualitative studies related to some of the latter interventions, but their methodological limitations mean that their findings are of limited use. Therefore there does not currently appear to be any directly relevant published empirical evidence on the effectiveness of 'low-level interpersonal support' as described in the 2014 Adult Autism Strategy.

The outcomes measured varied between studies and most studies measured proximal outcomes such as interview performance, social skills and autism symptoms. Few measured outcomes relating to functioning, mental health, wellbeing or quality of life. The limited evidence on these outcomes is equivocal, with no strong evidence that any of the interventions had a positive impact. Also, many studies measured several different outcomes without correcting significance levels for multiple outcomes.

The generalisability of the findings is questionable. Most studies were carried out in the USA and may not be applicable to the UK because of the different policy contexts, particularly regarding health and social care. Also, the reporting of sampling and recruitment was generally poor across all evidence types. In many cases participants were already in contact with specialist groups or services and were motivated to participate,

and may be unrepresentative of the broader population of people with autism spectrum disorders. There may have been other barriers to participation resulting from the nature and severity of participants' autistic symptoms, other physical or mental health conditions, or practical issues such as access to transport (several studies reported explicit exclusion criteria along these lines, but these factors may also have introduced bias at the sampling stage). While we did not conduct a full analysis of how sample demographics compared to source populations, it is clear that very few studies included middle-aged and older adults; it is also likely that people of lower socioeconomic status, black and minority ethnic people, and possibly women were under-represented in the evidence reviewed. To some extent this may reflect differences in diagnosis at a population level, rather than sampling bias in the studies, but nonetheless, populations encountered in implementing low-level support in practice are likely to be considerably more diverse than those found in these study samples. No data were available on how intervention effectiveness differed between subgroups.

There are potential concerns around the scalability of some of the interventions. For example, successful delivery of employment support may rely on constructive relationships with employers. The evidence of positive impact seen in the studies may therefore not transfer to practice on a larger scale.

4.2.1 Comparing the evidence to the logic model

The intervention categories identified in the review can be mapped against the components identified *a priori* and included in the logic model (Figure 1, on page 14 above). As shown in Figure 7, this indicates that there is substantial evidence relevant to only two components (teaching social skills and employment support), with some evidence tangentially relevant to facilitating social interaction, and very little to the other components: these are represented by shading in the figure, with darker boxes showing a smaller amount of relevant evidence and lighter boxes a larger. Figure 7 is only indicative, and there are cases where interventions may have addressed components other than those shown in the figure: for example, the social skills programmes, which were all conducted in small groups, probably contained an important element of facilitating social interaction; and some of the supported employment interventions, where individuals worked with caseworkers, probably contained elements of social and emotional support. The qualitative evidence also provides some pointers regarding the interventions not covered by effectiveness studies, although its interpretation is restricted by serious methodological limitations. Overall, however, mapping the effectiveness data to the logic model indicates that the different types of intervention are covered very unevenly by the available evidence. We return to this point in the "6. Overall synthesis, research recommendations and conclusions" chapter below.

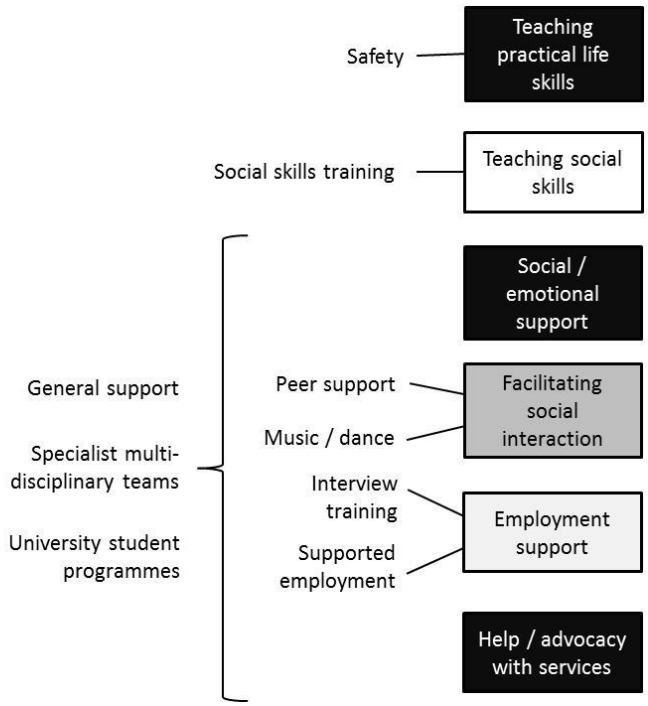

Figure 7: Intervention categories and components

4.3 Strengths and weaknesses of the review

This review was carried out according to full systematic review principles, with sensitive database searching, screening according to *a priori* inclusion criteria, and clearly defined instruments for quality assessment and data extraction. Nonetheless, it has some limitations. It is possible that the search strategy may have omitted some relevant terms, due to the difficulty of defining the scope of included interventions a priori, although there were no obvious omissions in retrospect.

Due to time restraints we double-screened only 10% of abstracts, and single-screened the remainder; and we did not chase citations from included studies nor contact study authors. Although we searched for, and included, unpublished studies, we were unable to retrieve some (N=53) full-text records, particularly non-UK theses, in the time available.

The review was intentionally broad with respect to intervention content. We did not adopt a narrow focus on studies evaluating low-level interpersonal support as defined in the relevant policy documents. Had we adopted such a focus, the findings of the review would have been very limited, with only a handful of low-quality qualitative studies included. Rather, the review provides a broad picture of the available evidence which may be relevant to low-level support services for adults with HFA.

It should also be noted that, while we aimed to make the scope of the review as broad as practicably possible, our criteria did inevitably exclude some material which might have provided additional contextual information, including:

- studies reporting only purely cognitive outcomes or correctness of task performance (including notionally job-related tasks)

- studies in which the mean age of the sample was under 18 years (including a few studies where the age was only slightly under 18, but which were otherwise relevant)
- studies that did not report empirical data, e.g. papers which only described the content and delivery of interventions, or authors' general opinions and views
- case studies only reporting authors' perceptions of participants' outcomes and not collecting either qualitative or quantitative data (although studies that reported qualitative data from service providers only were included)
- studies presenting questionnaire outcomes on views at a single time-point, e.g. on participants' satisfaction with interventions
- studies reporting retrospective or cross-sectional analyses of correlations where the data were collected only at a single time-point (i.e. not before and after an intervention)
- qualitative studies not relating to a specific intervention, including views on services received and on the broader contexts of participants' lives

5. Overview of aims and components of existing support services

The most recent statutory guidance to support the implementation of the Adult Autism Strategy in England requires local authorities to:

- "Provide or arrange services, facilities or resources, or take other steps, which they consider will contribute to preventing or delaying the development of care and support needs of adults in their area and support needs of carers, including the care and support needs of adults with autism and the support needs of their carers, regardless of whether they are eligible for social care. For example, this could be done through providing "lower level" local preventative support and enabling people with autism to be connected with peers and with other local community groups.

- Have regard to the importance of identifying existing services, facilities and resources already available which could assist with carrying out the duty above, as well as the importance of identifying adults in its area (including those with autism) with care and support needs which are not being met. To do this effectively they should consult with adults with autism and their carers, in order to establish what support already exists and what needs are not being met, to help determine what preventative services etc. are needed.

- Ensure that they include in local autism plans or strategies how people can access local autism advice and information easily in a way that is appropriate and identifiable for people with autism."

While much of the statutory guidance is concerned with the autism spectrum as a whole, the first two requirements above explicitly link the subgroup of adults with autism who are not eligible for social care with preventative support focused around supportive networks and better use of existing services. The guidance goes on to state specifically that local authorities should ensure that people with autism but without additional learning disabilities or mental health issues can access advice and information, giving the example of "a one-stop-shop that provides a safe and friendly place to speak confidentially to someone who understands autism, access, guidance, and information about services, one to one sessions, workshops, training days and group activities for families, children and professionals".[4]

The service mapping phase of this project aimed to provide an overview of current provision of low-level support services for adults with HFA in England. The methods for this phase were pragmatic, and evolved in consultation with the project Advisory Group as the project progressed. We have fully documented the process here to ensure transparency. The goal of this phase was to develop a better understanding of current practice in delivering low-level support services, and to provide context to make the findings of the review phase more meaningful and applicable to practice.

5.1 Methods

5.1.1 Sources and selection

The following three sources were used to inform the mapping of existing services:

1. Reports and publicly available details of Autism Innovation Fund (AIF) projects

    - We incorporated information from project reports by 34 organisations that had received support from the AIF. Additional information for these and other AIF funded projects (for which we did not receive reports) was obtained online and via other publicly available sources

2. A list of relevant services provided by the project Advisory Group

3. Autism Self-Assessment Exercise (SAE) returns 2014[53]

    - Within the Autism Self-Assessment 'Local Good Practice' supplement, we looked at responses to three specific questions:
        - 'What are you doing differently because of Think Autism – the update to the 2010 Adult Autism Strategy?'
        - 'Describe briefly ONE initiative of your council, relating to the provision of care for people with autism, which you think has been successful.'
        - 'Describe briefly the initiative of your council, relating to the provision of care for people with autism, which people with autism in your area think has been most successful and helpful'

We obtained the raw SAE data for these three questions from the Public Health England Improving Health and Lives website, and identified a total of 400 responses. While these have been very broadly categorised in the related Public Health England report,[53] many of the initiatives described in the Local Good Practice supplement, and the subsequent summary, were concerned with the broadest definition of Adult Autism services, rather than for adults with HFA.

In order to focus on the "aims and ingredients" of services relevant to this project, we limited inclusion of SAE responses to any services that specifically mentioned people with HFA, Asperger's Syndrome and/or those not meeting Fair Access to Care Services (FACS) criteria.

5.1.2 Data collection and presentation

We collected the following data on each service from the three data sources listed above:

- Location
- Organisation
- Programme name
- Population
- Intentions / Aims
- Ingredients / Components
- Context

Wherever possible, additional information was obtained from websites and other relevant sources. We then attempted to categorise as concisely as possible any discrete supportive components described within the data sources. As we were dependent on the adequacy of reporting in the various data sources, any service components that were not described were also omitted here and it is possible that some of the services included unreported components. The available information was examined for each included service to identify possible themes to help group the range of services. All of the descriptive and analytical work described in this section was conducted by an individual researcher and draft findings were then considered by the research team as a whole.

Consequently, the information presented in Appendix 9 is intended to illustrate the kinds of components that identifiable services had recently been implementing. It does not provide a comprehensive description of these services.

We grouped individual service components according to the emergent themes and cross-tabulated these components against the list of service providers (Appendix 10**Error! eference source not found.**). We then wrote up a description of the type and range of service components, and the ways in which they were configured, in a narrative.

5.1.3 Illustrative case studies

After consulting with the project Advisory Group, we selected three services identified from the service mapping exercise to describe in greater detail. We sought services that could illustrate the variation in approaches toward what might be considered 'low-level interpersonal support'. These case studies have been included to provide greater depth and context on the delivery of local low-level supportive services for adults with HFA. The three cases selected were:

- Worcester Rainbow Autism Spectrum Hub
- Leeds Autism AIM (Advocacy, Information and Mentoring)
- BASS (Bristol Autism Spectrum Service) Autism Services for Adults

Further information on these services was sought again from publicly available sources and from direct contact with the service providers via email and informal telephone interviews. Information on outcomes was extremely limited and we did not aim to evaluate the effectiveness of these services. Where possible, we obtained information on:

- Aims and objectives, including context for service development
- Population served
- Setting
- Staffing
- Funding
- Activities
- Processes
- Implementation issues
- Cost issues

5.2 Results of the service mapping

We present a broad overview of the range of intervention components being delivered locally and the various ways in which these have been combined to provide supportive services for adults with HFA. More detailed information on some of the services presented here can be found in recent reports, for example those published by the Local Government Association.[54]

5.2.1 Number of services identified

A total of 139 local services were identified from the three data sources. Of these, 11 entries either provided no information about service components, described services that were not focused on preventative support for adults, or were duplicate entries. The level of detail available for the remaining 128 included services was generally very limited.

5.2.2 Service components

To provide a clearer overview of the types of service components currently being provided for adults with HFA, we grouped the full list of components listed in Appendix 9 into 21 themes that emerged from the data. This included:

Categories of intervention:

- Teaching / training service users
- Employment support
- Individualised / one-to-one support
- Peer support
- Family / carer support
- Other support / activity groups
- Information resources / signposting
- Social / creative events and activities
- Advice and guidance
- Advocacy / liaison
- Teaching / training professionals / public / families / employers
- Needs assessment / post-diagnostic support
- Mentoring

Modes of delivery:

- Drop-in / hubs
- Health professional involvement
- Telephone / email / online support
- Collaboration and coordination with other organisations
- Social enterprise
- Outreach services
- Assistive technology (mobile apps / cloud-based or virtual services)
- Social media
- Other

Appendix 10 cross-tabulates the identified services against these 21 component themes. The most commonly reported components appear to the left-hand side of the table, and services that reported the highest number of different components appear at the top of the table.

Few services were restricted to a single component; most service providers described multicomponent services, employing an overlapping mixture of supportive approaches. The numbers in parentheses, in this section of the report, refer to ID numbers of illustrative examples in Appendices 9 and 10. Because of the high degree of overlap in components, we have not cross-referenced every service in the tables.

While most services could be broadly considered low-level support, some combined low-level preventative components with clinical or therapeutic approaches. In fact, preventative low-level interpersonal support was rarely described without some description of additional components relating to other areas of the Adult Autism Strategy, such as needs assessment, diagnosis or employment.

The most commonly described components involved some form of **training or teaching** specifically targeted at adults with autism spectrum disorders. These might consist of short training programmes on communication, independence, relationships, safety (9, 80), literacy and numeracy, basic nutrition, menu planning, money management, self-understanding, healthy living, living in the community, work readiness (21), or customer service training (88).

Less frequently, services included training for professionals, the public, or for family members of people with autism. This included **autism awareness training** for health professionals, local authority and college staff, as well as training for volunteers on travelling with people with ASD (35). Other services reported **training for families** (86) of people with autism, including those who displayed sexually harmful behaviour (27/28). A small number of services aimed to enable people with ASD themselves to develop the necessary skills to provide autism awareness training to others (15), or to speak about their experiences (and be paid for doing so) as part of training or consultancy for professionals (77).

After training, teaching or education, the most commonly described component of supportive services was some non-specific form of **employment support**. Where details were available, this included: work experience placements (12); assessments to determine individuals' employment skills and aspirations (5, 15); liaising with or recruiting autism-friendly employers (15,47,91); supported internships (21); job clubs (21); recruiting employers as Autism Employment Champions and alongside apprenticeships for young people with ASD (38, 122); job coaching (40, 59); providing interview support (49); support for employers (133); ensuring reasonable adjustments to the workplace for employees with ASD (59); support with Curriculum Vitae (CVs), job searching and interviews (5); and work placement buddies (5).

A substantial proportion of services described "**individualised**" (58, 65, 66, 78), "bespoke" (107) or "person-centred" (131) approaches, some of which specifically referred to "one-to-one" support for adults with autism (47, 60, 65, 84). Such support could relate to independent living, accommodation, travel, accessing services, employment, education

(60, 65), relationships, and life skills (66). In most cases it was unclear precisely who would provide this one-to-one support, though some examples specifically referred to personalised social care services (61, 67). One service described a behaviour co-ordinator providing one-to-one help to deal with anxiety and increase quality of life (78) and another described an individually-delivered social learning programme for people who find group-based activities difficult (130).

Two local authorities (Redbridge and Oxfordshire) specifically mentioned personalised support relating to **Fair Access to Care Services (FACS) assessments**. This included one-to-one support before, during and after FACS assessment (116, 121), including holistic support and follow-up through a single point of access for those adults with autism who are not FACS eligible (116).

In some examples, there was an overlap between personalised support and the concept of **mentoring** (59). Various other approaches to mentoring have been described, including work placement or employment mentoring (59, 91, 93), specialist academic mentoring for students (74), specialist 'meltdown' mentors (98), specialist mentors to help develop strategies for coping (23), and coaching and mentoring techniques based on the principles of positive psychology (107). Some services described mentoring being provided by trained volunteers (1), or through a peer and mentor support network (17).

Commonly reported components included the provision of **information** and **advice** (e.g., housing, employment, safety, communication, benefits and finances, relationships, mental-health, business start-up opportunities (26), and managing emotions (60)). This could be provided on a personalised, individual or one-to-one basis, via **social media** (22, 114), **telephone** or **email** (52). **Local service directories** were another form of information provision. **Signposting** was also mentioned, sometimes as part of a specific post-diagnosis care pathway (113). One notable service made use of a mobile library to provide these services and raise awareness for more difficult to reach rural communities (14).

As well as information and advice relating to employment, housing, services, benefits etc., many services incorporated some form of **advocacy**. While little specific detail was provided, some advocacy approaches employed **peer support** methods in which people with HFA offered support to other individuals to enable them to engage more effectively with health services and tap into alternative autism resources (3/103). **Support groups** for people with HFA were commonly reported, with some services also providing separate partner and parent support groups (114, 117, 138).

Several services were based around the idea of **autism hubs** and/or **drop-in sessions** at dedicated sites. One such hub had an explicit emphasis on social-work led support for crisis prevention (12). Autism hubs or day centres could provide various facilities and activities, information and advice, signposting, **social activities and events** (e.g. arts and IT activities, board game and book groups, cinema and pub outings), life skills classes or workshops, and **support for carers and family members**. Carer and family support could take the form of counselling, training (86), respite provision (29, 96), advice (131) or peer support (117).

Outreach services were also mentioned, though often without specific details. Where described, outreach services focused on education, employment, sports and leisure activities, arts, life skills etc. One service described targeted preventative social welfare support around life after school (46). One Autism Innovation Fund supported project provided a **respite service** for adults with autism, based around two yurts (29).

A small number of local **social enterprise** initiatives were mentioned (15, 73, 49, 135), though again details were limited. One social enterprise aimed to enable people with ASD to gain skills around training and presenting, creating employment opportunities and enabling autism awareness training to reach a wider audience (15). Another related to an "Open Arts" project (135), and elsewhere there was mention of support for people with ASD selling their creations from art classes (26). While not considered social enterprises, a number of other projects directly employed adults with ASD to help deliver their service (1, 8, 12, 14, 15, 29, 42).

Where described, **health professional involvement** usually related to diagnosis or post-diagnosis support. This might include GP referral to a key worker for one-to-one support (59), or multi-disciplinary team assessment (involving a Clinical Psychologist, Psychiatrist, Speech and Language Therapist, Asperger Nurse Specialist, Asperger Liaison Nurse, Social Inclusion Worker, and Occupational Therapist)(57).

Some services incorporated **assistive technologies** such as: a **3D virtual world** in which peer support, mentoring, advice, and social interaction could be delivered (8); **software apps** and **cloud-based services** to manage daily living, track anxiety levels, reduce the need for recourse to inappropriate behaviours, and allow progress to be monitored by carers and families (in some cases in real time) via tablet or smartphone (4, 23, 107); and text-message reminder-based **telehealth** support (109).

More novel approaches included a **friendship and dating agency**, with arranged social events (24); a **sensory therapy suite** to provide sensory integration therapy (44); and a **social business concept** that provided assessment and training to understand the aptitudes, interests and employment support needs of adults with ASD, some of whom were then employed as information technology (IT) consultants for corporate clients (34).

Some of the responses in the Autism Self-Assessment 'Local Good Practice' supplement identified **coordination and collaboration** among organisations as an important part of service delivery (102, 103, 110, 116, 116, 128). These included: an Asperger's Social Care team working closely with mental health services, criminal justice and substance misuse teams (110); working with local health providers and Job Centre Plus as part of pre- and post-diagnostic personalised support (115) and; an Autism Coordination Group separated from Learning Disabilities commissioning to support effective planning and development (128).

5.3 Illustrative case studies

Below we describe three case studies in order to provide additional context and detail about the kinds of services we identified in the mapping exercise. Any opinions or judgements included here have been expressed by the service providers; we have not added our own interpretations to these summaries.

5.3.1 Worcester Rainbow Autism Spectrum Hub

Aims and objectives
To provide a single point of access (the "Spectrum Hub") to take referrals, then deliver and coordinate information, support and services for those living in the Worcestershire and Herefordshire area. The hub was devised to provide a 'two-way' access point for information, signposting and easy referral between Rainbow Autism staff and those with autism spectrum or those involved in their care (including parents/carers, health and social care professionals and other organisations). The Spectrum Hub has been proposed as the fulcrum of a holistic approach to delivering local support and services to adults with ASD.

Population
Adults with mainly, but not exclusively, high-functioning autism.

Setting
Community centre-based access point.

Staffing
Social-work led specialist team (including both professional and support workers with a variety of skills), with a network of links to other professionals and services (including psychologists, social workers, mental health nurses, housing providers, Job Centre/University/College Disability Advisers and community organisations).

A total of 44 hours per week divided between two social workers was initially planned, though both social workers provided additional work at times to manage crisis or meet demand. All support staff were on part-time contracts (10 to 30 hours per week).

A psychiatrist was employed on an *ad-hoc* basis when a clinical diagnosis was required.

Volunteers were sought to organise a carers' group.

Funding
Autism Innovation Fund supported the Spectrum Hub pilot for six months. Diagnostic assessments were funded by the local council. The wider Rainbow Autism service was a non-profit social enterprise run as a community interest company.

Activities
A range of services were delivered either directly or through referral:

- Social Care Assessments of Needs: predominately undertaken by Rainbow's hub social workers, with some passed on to local authority or NHS social workers or community psychiatric nurses as necessary

- Crisis management: many cases involved referral and joint working with others (such as community mental health teams (CMHTs), housing providers, GPs, or local safeguarding teams)
- Diagnosis/Diagnosis Assessment: either referred to a clinical associate for ASD diagnosis, or diagnostic assessment undertaken by Rainbow's own assessor. A small number of cases were referred to the associate psychiatrist
- Benefit support: All benefits cases involved a support worker with experience in the area (with occasional input from social workers) interviewing and advising claimants and parents/carers, drafting application form content and in most cases completing the application form on behalf of the claimant. This also involved attending all Employment Support Allowance (ESA) medicals and Personal Independence Payment (PIP) medical assessments with claimants, dealing with any Mandatory Reconsiderations and, if necessary, attending and representing the claimant at tribunal. Representing clients with issues regarding Housing Benefit, Council Tax, Rent arrears, debt issues and potential benefits fraud cases. Also dealing with Jobcentre Plus and the DWP regarding any benefits issues and helping to explain and assist with all general paperwork to do with a person's benefits
- Employment Support: Weekly "Skills for Meaningful Occupation" (CV building, role play, looking at work opportunities and roles, individual goal setting and support to access voluntary or work placements). The delivery of the sessions included support from other organisations, local employers and crafts groups. Also arranging access to voluntary placements; application for jobs; advocacy; providing information on opportunities available in the local area; and networking with other agencies to increase awareness and promote the skills of those with ASD
- Counselling/Psychotherapy: Autism-specific counselling provided directly by Rainbow, bypassing long waiting lists for counselling through health services
- Family support: Meeting with family members, providing advocacy/information, offering support group or help to improve confidence and communication in order to resolve conflict and improve relationships
- Advocacy: Provided primarily by social workers or benefits advisors, although people on the spectrum (staff and volunteers) acted as advocates. Included benefit or medical assessments or tribunals, employment tribunals, helping females with ASD to have their needs recognised by social services; speaking with the police; speaking with partner or parents to avoid family breakdown
- Housing support: Supporting individuals at risk of eviction or homelessness, undergoing family breakdown, living in poor conditions, or struggling to maintain their independence. Working with local housing providers to finding suitable properties for people wishing to move into independent living, to raise autism awareness, and to improve or minimise the risk of problem tenancies
- Support with money management/debts (in addition to any benefit support requirements)
- Independent Living Skills workshops: Including a pilot cooking/healthy living workshop, enabled by Rainbow working in partnership with a local housing provider
- Social groups: As well as being supportive for service users, these provided staff with insights into people's experiences of trying to access support and services as well as their particular needs and preferences
- Carers' group

Processes

While the pathway varied according to circumstance, the typical pathway to support was as follows:

1. Referral/enquiry received by staff of the hub. Referrals come from a variety of sources - including: self-referral, GPs, CMHTs, social workers, commissioners, professionals, carers, disability advisers in public organisations (such as college or Jobcentre) and a range of other organisations
2. Information provided and referral form/details of Rainbow's services sent out via email or post (may also include details of other services and/or a self-assessment form depending on the needs identified at the initial contact)
3. Referral form and needs assessment (where applicable) returned
4. Contact with individual made and arrangements made to meet with a specialist social worker to further discuss/assess needs and available options. Alternatively, if the individual is in a crisis situation, the social worker will take necessary actions to manage the situation i.e. meet with the individual, advocate (where necessary), make referral to other services if required, and allocate a Rainbow support worker to the individual (delegating tasks where necessary)
5. Support planning/goals identified and agreed by those involved
6. Support provided to meet the individual's needs (usually completed over a period of time)
7. Review to establish whether:
    a. The individual's needs are met
    b. The individual remains with Rainbow for on-going regular support (through individual funding or other agreement)
    c. Intermittent outreach support needs to be provided
    d. The individual is referred or signposted to others, but will remain open to the Rainbow team indefinitely
    e. The service user chooses to withdraw completely from one-to-one support, but can access support at Rainbow or NAS Branch regular group meetings or by booking an appointment with staff
8. Individuals can self-refer or be re-referred back to the Hub and the process above will begin again

Implementation issues

The service providers identified a number of benefits of their particular support model, including:

Deeper engagement: The service providers stated that, through a menu of varying support and activities, along with collaboration of different disciplines, they had repeated chances to observe and become better informed about individuals. They contrasted this model and practice with the clinical setting of an average 40 to 45 minutes for a monthly appointment, with a professional that a patient may have difficulty engaging with.

Responsiveness: The service providers argued that more bureaucratic or clinically-led systems were unable to respond quickly, which was sometimes required when a person's needs go from low to critical (a common trait of ASD is high anxiety being triggered by unexpected or unfamiliar change occurring).

Filling a gap: The hub's specialist social workers provided needs assessments and support that some service users felt they could not access through social services.

Flexibility and timeliness: Service users could be seen in various settings (such as on a one-to-one, within a group, with friends, parents, at home, at college, when consumed in their 'special interest' or when being questioned on their health status in a clinical setting or police interview). Hub workers had the ability to refer to a range of support services, beyond a list of 'preferred providers'. Many service users also reported receiving a more timely and effective response to managing situations (especially where risk of crisis was evident) than they had previously found in public services.

Expertise and trust: The service providers felt that responsibility for assessing the needs and then coordinating support and services should fall to specialist social workers and multi-disciplinary teams. They reported that users valued the hub staff's deep understanding and experience of ASD, as well as their familiarity with the varying public systems (with their benefits and limitations). The service providers believed this promoted greater trust in the service that enabled effective engagement and motivation of individuals to take necessary actions to achieve personal development and successful outcomes.

The service providers also noted challenges in being able to deliver an effective service. They found diagnosis to be the biggest area of challenge with regards to inter-organisational working and to individuals being able to access services, especially within mental health. They often found opinions on diagnosis and 'treatment' a topic of contention, with some controversy between one professional's opinion and another. Personality disorder was most commonly the original diagnosis given to individuals later diagnosed with ASD, and clinical treatments had not worked with those being referred to the hub. Many users reported experiencing a 'revolving door' of needing medical intervention and hospital admissions. In some cases, organisations were not willing to share information or refer to the Spectrum Hub. Rainbow had no statutory responsibility, nor influence, to overturn the decisions of other organisations where they felt a service-user's needs were not being met.

The service providers suggested that greater access to personalised budgets would enable them to coordinate more regular and person-centred support and ensure the 'revolving door' of requiring primary and secondary services decreased. They added that the model required one single point of access and a clear agreement and pathway to other coordinated services.

The service providers stated that the "number one factor" to successful implementation of the Spectrum Hub was ensuring the core staff had a deep knowledge, understanding and experience of working with those with autism (preferably in a range of settings and with multiple disciplines within the team). They suggested that the core staff should predominately be those from social work, with a support staff that had experience of high-functioning autism. They suggested that a part-time clinician or professional with a mental health background could also be useful depending on the number of referrals with clinical needs. The model would also benefit from support staff with a background in advocacy, employment or the DWP. In addition, an administrative staff member might be employed to help support data collection and evaluation.

The service providers suggested that partnering organisations and professionals should include those working in key local public sectors (i.e. commissioners, mental health and social care, housing, Job Centres, and Schools/Colleges/Universities) plus those from voluntary sectors providing activities to support employment/training/education opportunities, housing, meaningful activities, independent advocacy and social groups. A group of people on the spectrum and carers should also be included to act as advocates (either working within the core team or as one of the associate agencies). Trust and ease of referral between partners and associates were identified as being vital, allowing for a two-way process of information sharing, referral and resources, wherever possible.

The service providers stated that the availability of a variety of providers would enable individuals to have true choice and control, and that smaller community organisations might be better placed to provide the specialism and flexibility required to meet the specific and often fluctuating needs of people with ASD.

Barriers to the implementation of this model were also discussed. For example, the service providers reported that many service-users sought continuous reassurance or frequent explanation of situations or processes, which could delay the support being offered and would not always be the best use of staff time when other priorities were presenting. Staff therefore required patience and understanding and some users had to be provided with boundaries of what could be discussed and when.

The hub staff had to provide a great deal of 'out of hours' and voluntary support via email or social networking, which would need to be addressed by any other provider planning to deliver a similar service.

Cost issues

The local authority earmarked a £100,000 annual budget for adults with HFA. Rainbow Autism received £30,000 of this in 2010, and £20,000 in 2011, before the contract for the service they created was won by a different service provider. Rainbow Autism now relies on helping people who have personalised budgets or who can self-fund, while trying to raise funds from entrepreneurial projects, from local businesses and donations.

5.3.2 Leeds Autism AIM (Advocacy, Information and Mentoring)

Leeds Autism AIM (Advocacy, Information and Mentoring) was a pilot project funded by the Department of Health's Autism Innovation Fund. The project was set up after local needs analysis, and other consultations, identified a gap in services for adults with ASD with little or no funded support. The need identified was for low-level support and provision of more effective information and signposting for this population.

Aims and objectives
To develop a mentoring service, information services, advocacy input and to begin a one-day autism drop-in service.

Population
Adults with HFA with little or no funded support.

Setting
Autism Hub one day per week at a Mental Health centre. Some information/signposting was provided by phone and email.

Staffing
Project manager/co-ordinator, two support staff at the drop-in hub and a local specialist Citizens Advice Bureau (CAB) lead (who also trained as an autism mentor) to provide CAB support in the hub setting. Multiple support volunteers, several of whom were adults with Asperger's Syndrome.

Funding
Local authority (Leeds City Council) provided the drop-in venue and two support staff. Leeds Advocacy (voluntary non-profit organisation) provided coordination and management of the drop-in session, access to volunteers and information advice and resources. The initial six-month pilot phase was funded by the Autism Innovation Fund, with subsequent funding provided through small local grants, the Autism Partnership board, and short-term funding from the local CCG earmarked for linking service-users with health services and post-diagnostic support.

Activities and processes
Services and activities at the Autism Hub included: information/signposting, advocacy (including some joint working with CAB); mentoring; peer support; and facilitated groups.

Information and signposting was delivered by phone and email as well as via information resources (including books, paper information and two laptops) at the Hub. Timetables of activities were available via social media pages. Information and signposting was provided in relation to:

- accessing support services (autism and non-autism)
- assessments
- how to refer for diagnosis and what to expect
- post-diagnosis
- housing
- support with complaints or letters
- mental health

- employment
- access to health and mental health services (contacting GP etc.)
- referrals to adult social care
- benefits/finances/legal aid
- volunteering opportunities
- education opportunities
- managing relationships
- Strategies for managing day to day

The main areas of enquiry for the CAB **service** related to: benefit checks/income maximisation, benefit applications and administration, employment, debt advice, support with mandatory reconsiderations and appeals, housing, and relationships and family.

The need for formal funded advocacy support at the hub was initially reduced by the availability of the CAB outreach worker and mentors taking on some aspects of the advocacy role. However, some aspects of advocacy were broader than the remit of CAB outreach, so there were plans to increase advocacy capacity by employing one advocacy assistant and one paid peer advocacy support worker.

The mentoring service matched volunteer mentors to mentees for a limited time period, in which the aim was to enable mentees to manage their condition themselves and ensure better access to available support. This differed from longer-term autism citizen advocacy work. It used an autism-specific initial assessment to determine their needs and measure progress. Mentors provided support on issues such as employment, social isolation and access to activities. Mentors were supported with monthly sessions in which they could confidentially share experiences and information and receive supervision. They also had access to advocacy and negotiation skills training. The organisation had started the accreditation process with the Mentoring and Befriending foundation.

Facilitated **groups** included:

- Employment group: Runs monthly as a gaining and keeping employment group by a volunteer with Asperger's Syndrome with an average of six attendees per session
- Women's group: Run monthly by a volunteer who was a trained counsellor with Asperger's Syndrome and had experience of running group sessions. Having a specific women's group attracted women who said they may not otherwise have attended
- Cooking group: A trained chef (one of the Hub Leeds City Council staff) developed a cooking session with an emphasis on safety and sequencing cooking activities as this was an area people said they often struggled with
- Relaxation group: Led by a member of Leeds City Council Mental Health support staff, who had experience of group work and had developed experience of this client group.
- Peer support groups were originally provided, but were found to work well informally

Leeds Autism AIM did not provide diagnosis and counselling directly, but signposted people to the appropriate services, supporting access to those services, where necessary.

Since the pilot period, the service had added employment support in partnership with the DWP. This included supporting service-users with completing employment profiles and

arranging short (30-minute) employment coaching appointments. Some service-users had also been helped in developing personal health action plans, and there were plans to create links with social prescribing services and black and minority ethnic (BME) groups.

Implementation issues

The service provided an autism-friendly environment to accommodate the sensory needs of users. This included providing appropriate environmental arrangements regarding noise, lighting, scent and signage. The service coordinator noted that these arrangements might have to change over time. For example, as the Leeds service became more popular, a previously designated quiet space could no longer be kept quiet. The service providers also highlighted the importance of the hub being both accessible and easy to locate.

As the adult autism service was delivered in a Mental Health centre, a shared protocol was developed; centre staff were given autism awareness training and the autism service used existing equal opportunities monitoring arrangements. However, the anxiety felt by some adults with ASD about contact with mental health services was identified as a possible barrier by the service providers.

The service was led by a steering group of adults with ASD and had a core group of Asperger's volunteers. They challenged and suggested changes, where necessary, and led on all aspects of the service, running groups, providing peer support and providing role models to other autistic adults who attended. The service coordinator believed that this could help partly counteract the mental health setting barrier and had helped identify employment support and greater support around Improving Access to Psychological Therapies (IAPT) as priorities.

The service providers noted a synergy between the different strands of the service, for example, CAB and mentoring input both reduced the need for formal advocacy hours. Similarly, links and information obtained from the information directory helped with mentoring and signposting. Volunteer mentors could also provide additional general support at the Hub.

To date, the service has maintained consistency in its paid and volunteer staff. The service coordinator noted the importance for service-users of being able to interact with familiar staff who have had autism training and/or received follow-up from a named person. However, there was an aim to develop sustainability and avoid the service being too reliant on the presence of a few specific individuals.

The service coordinator also considered a key strength of the service was retaining its focus on the initial aims of peer support and information aimed at people who received little or no funded support. While the hub offered a range of activities, it was not intended to be a free day service and so could not offer structured activities for the whole session. Users from outside the local area were not turned away, but were signposted to the most appropriate group local to them.

Cost issues

While there were benefits of having a volunteer-staffed mentoring service, a substantial amount of preparation and "chasing up" time was needed to recruit, train, retain and supervise the volunteers.

During the pilot period, around 28 hours per week were required to manage and coordinate, plus additional hours to take enquiries, discuss what the service offered and whether it was suitable. Further hours, outside of the Hub opening times, were needed to establish links with external organisations, review the service, purchase resources and develop publicity materials.

Crucially, the costs of the project did not include the use of the building and two staff allocated by Leeds City Council, nor the support of the CAB specialist. The service coordinator noted that the Local Authority needed to ensure that their buildings were well utilised, with this service being viewed as one way to attract an otherwise difficult to engage group.

5.3.3 BASS Autism Services for Adults

Unlike the previous examples, the BASS Autism Services for Adults was a well-established statutory-driven service provided by Avon and Wiltshire NHS Partnership Trust. The service had been running in Bristol since 2009, followed in 2013 by two spoke services in Bath and Northeast Somerset and North Somerset, with the service starting in South Gloucestershire in 2009. While much of its work related to clinical diagnosis, some aspects (such as post-diagnosis group support) overlapped with previous examples of 'low-level' support.

Aims and objectives
The service had two main objectives:

1. To provide workforce support to agencies across the adult autism care pathway, from health and social care services to the voluntary sector, through training, supervision and engagement
2. To provide direct services to adults with autism who couldn't otherwise access mainstream services (i.e. adults with HFA), including diagnostic assessment, post-diagnostic support, needs assessment and preventative interventions

Population
Adults with ASD and professionals and carers who support them.

Setting
Community Mental Health resource centre.

Staffing
Staff equivalent to 20.3 work time equivalent (WTE), consisting of administrators, assistant psychologists, specialist nurses, social workers, a training and liaison officer, occupational therapists and a small amount of part-time input from a consultant psychiatrist.

Funding
Recurring CCG funding.

Activities
Workforce support activities included:

- Ongoing programme of training throughout the adult autism care pathway, ranging from one-hour awareness raising to whole-day role-focused training for Improving

Access to Psychological Therapies (IAPT), social care, inpatient, community and residential providers, jobcentres, GPs, counselling services, supported employment agencies etc. Training was then followed-up with one-to-one support/supervision sessions, where requested. For example:
    - Train and supervise mental health and learning disability professionals to diagnose people with autism in their services
    - Train and supervise social workers in making community care needs assessments for adults with autism
- Engaging with services on a strategic level, helping them to modify and adapt their services in order to make them more accessible to people with autism.

Direct support for people who couldn't access mainstream services included:

- Assessment and diagnosis for people referred from primary or secondary care
- Post-diagnostic support - psychoeducation, coping strategies and signposting
- Social support assessments for people who had been diagnosed by the service – bridges the gap between diagnosis and a full community care needs assessment. Forms the basis of subsequent signposting
- Preventative interventions intended to avoid the need to access mental health services: Self-directed support networks, problem solving groups, psychological therapies for issues outside the remit of IAPT
- Advice service incorporating one-to-one sessions and groups on mindfulness, managing anxiety, social cognition and interaction

BASS did not hold a caseload nor provide care coordination. It accepted referrals for people within Bristol, North Somerset, Bath and Northeast Somerset and South Gloucestershire. Referrals outside of these areas could be seen on a cost per case basis, subject to funding being agreed by the referring CCG.

Processes

Assessment and diagnosis:
The assessment process usually required service-users to attend two 90-minute appointments. Before the initial appointment they were sent questionnaires for completion. Service-users were asked their childhood and current situation. Any available medical, psychiatric and psychological reports were taken into account. The assessment process was also aided if a parent, relative or a friend who could report on the users' developmental history and/or current abilities could attend. If possible, the results of the assessment were given at the end of the second appointment (or at a third appointment), though some people might have needed to be seen for further appointments. A supervised diagnostic pathway was available for individuals who were accessing Secondary Mental Health Services.

Post-diagnostic support:
After an individual received a diagnosis of an autism spectrum condition, they were invited to attend a six-week post-diagnostic support group and weekly advice service.

The six-week post-diagnosis support group aimed to give people who were diagnosed with autism a full and accurate understanding of the condition, covering:

Session 1 & 2: What are autism spectrum conditions?

Session 3: How your condition affects you

Session 4: The experience of receiving a diagnosis of an autism spectrum condition

Session 5: Disclosing the diagnosis

Session 6: What happens next? Support networks and other services

Individuals might also be eligible to attend one of the autism advice services, which provided both one-to-one and group support. Depending on location, one-to-one support could address:

- Housing
- Education
- Employment and volunteering
- One-to-one job coaching
- Relationships
- Managing emotions
- Social Work
- Advocacy
- Carers' support
- Learning more about autism
- Signposting to other services

Groups included:

- Anxiety management techniques
- Mindfulness
- Problem solving
- Anxiety management
- Walking group
- Music group
- Partner/spouse group
- Carers and families afternoons
- Film group

Implementation issues

BASS preferred to take a facilitative role by helping people with autism access mainstream services, and by increasing skills and knowledge to allow mainstream services to work effectively with people with autism. This included diagnosis: wherever possible, BASS aimed to support health and social care professionals to perform diagnostic assessments within their own service. This facilitative approach increases capacity for diagnosis within mainstream services, allowing its limited resources to be focused on direct intervention for the subgroup of people who have the greatest difficulty accessing mainstream services.

BASS specifically did not take responsibility for coordination of care; with an estimated 5,000 adults with autism in Bristol alone, the service did not have the capacity, time and

resources to undertake the complex mixture of paperwork, forming of therapeutic relationships and planning of care that coordination demanded. While it supported other services, the responsibility of care coordination/management remained with the referring agency.

In addition, retaining most of the responsibility for assessment, treatment, and coordination within mainstream care was intended to increase sustainability by reducing the risk of autism expertise becoming confined to a small specialist multi-disciplinary team.

The service providers highlighted the value of having a network of autism champions within the various organisations who received signposting from the service, so that service-users could receive predictable and consistent continuity of care when contacting the new provider.

Feedback suggested that people enjoyed the shared experience provided in group-based post-diagnostic support. The providers suggested such support should provide detailed information about what will happen next, in a structured closed group with skilled facilitators.

In terms of social work provision, local learning disability teams took on responsibility for adults with Asperger's Syndrome. These teams proved receptive to training and supervision from BASS.

5.4 Strengths and limitations of the service mapping

The most recent Autism Self-Assessment Exercise included a 'Local Good Practice' supplement, which asked Local Authorities to outline their response to Think Autism and to nominate a single initiative they considered successful. The detailed report and thematic assessment accompanying the data included only a very brief narrative overview of the major themes covered in the Local Good Practice supplement.[53]

We have expanded the scope and depth of that overview to incorporate additional sources and extracted available data on the aims and components of current services. As far as we are aware this is the first attempt to conceptualise and classify the components of supportive interventions for adults with HFA or Asperger's Syndrome.

However, while this is the most complete mapping of services currently available, it is unlikely to be comprehensive. We relied on secondary sources and, as such, are restricted by the information provided in the brief service descriptions. Some aspects of the included services could be considered more intensive than 'low-level' support. The limited details about individual services and absence of a clear definition of 'low-level interpersonal support' made it difficult to apply this as an inclusion criterion. We therefore erred towards being overly inclusive rather than risk excluding potentially relevant services from the overview.

Responses to the Self-Assessment Exercise in particular were often extremely brief or vague. The missing detail is important, particularly in relation to implementation, costs and outcomes. So, for example, while we were able to extract some information on the

most basic components of services, we did not have an insight into any underlying philosophy or rationale or wider local context.

The three case studies are not necessarily representative of the full range of services for people with HFA in England. We aimed to highlight a diverse range of service types in the case studies, but as the service mapping shows, there are many other service types and components being offered.

The case studies are based only on discussions with service providers. We did not collect service users' views on the services provided, or seek to explore their views or preferences on what services should be available for people with HFA. While the project Advisory Group – which included service user representatives – provided strategic guidance and feedback, the project was not based on extensive engagement with people with HFA or their families or carers.

5.5 Discussion

Based on our discussions with service providers, the "one-stop-shop" or "hub" approach, in which there is a single point of contact (be that physical or virtual) appears to be well-suited to the HFA population, as it provides flexible support in a predictable environment, that people can engage with in a way that suits their needs at any particular point in time. In line with the statutory guidance, these hub-type approaches typically appear to follow a referral/brokerage model for adults with HFA, with an emphasis on information provision and signposting rather than delivery of interventions, overt case management or care coordination.

A key strength of local supportive preventative services for adults with HFA appears to be their flexibility and responsiveness, which allows a degree of personalisation, not easily achieved in mainstream statutory services. Some of these services could be better integrated with existing mainstream provision to ensure that this group of adults is not at risk of becoming reliant on entirely *ad hoc* arrangements.

The nature of relationships between supportive services and established local authority/NHS services seems to vary across regions. The precise boundaries between the supportive services that have recently emerged and pre-existing statutory services are not always clear. For example, the role of local services in diagnosis appears to vary between providers. Among the examples presented here, a primarily clinical diagnostic service such as BASS undertakes diagnosis and subsequent support for adults with HFA who have been referred from primary or secondary care, whereas Leeds AIM simply signposts people to clinical diagnostic services, providing additional support, where necessary. Worcester Rainbow Autism proposes having specialist staff in place to undertake diagnosis in a hub setting in order to engage difficult-to-reach undiagnosed or possibly previously misdiagnosed groups who are unable or unwilling to contact clinical services. Some of these differences may be attributable to the staff leading the service (e.g. clinical psychology vs. social work vs. volunteer/peer-led), available resources, and the availability of expertise elsewhere (e.g. where learning disability services have expanded into working with people with HFA).

It appears that the local services for adults with HFA, spread around the country have similar goals and delivery models and they are encountering similar challenges. Challenges include:

- sustainability of services, particularly in relation to changes in funding and staff
- increasing demand for services
- changes in service-user engagement over time

Although, it is not clear to what extent providers of services are familiar with each other's work, and the challenges faced, it is clear that there is a great deal of enthusiasm and growing expertise across both statutory and non-statutory supportive services and that this could be shared more widely.

As discussed further in the following chapter, there are many low-level support initiatives that have not been evaluated in the literature. One possible explanation for this might be difficulty in evaluating (and generalising from) complex interventions incorporating multiple components and multiple agencies. Speaking with service providers suggested that there is enthusiasm for better evaluation of these services, but often a lack of necessary resources and skills to do this at the local level.

5.5.1 Models of service delivery

The service mapping has revealed that the types of interventions identified in the systematic review (social skills development, employment support etc.) are being delivered in England, but rarely in isolation. Though a minority of services were narrowly focused on one aspect (e.g. teaching life/social skills), most provided a range of interventions as components of larger initiatives, and even the discrete components offered in current practice may only superficially resemble those that have been evaluated. 'Social skills training' for example could encompass a divergent set of methods, content and delivery.

At a more general level, we can make a distinction between the specific interventions and strategies which may form part of a low-level support service, and the service itself. The former may include well-defined programmes like those evaluated in the effectiveness evidence, such as education on social skills or daily living skills, and supported employment schemes. It could also include, for example, peer support groups, mentoring programmes, advocacy and advice on services, and general social and emotional support offered on an *ad hoc* basis; as well as formal diagnosis and assessment, and clinical or psychotherapeutic interventions. Notably, these specific interventions can include some which have a set focus and are more fixed and directive in their implementation, and some which are more responsive and aim to respond to individuals' diverse needs.

The service itself can be seen as a means for hard to reach people to access support, distinct from the intervention components on offer. Available services can be viewed as a continuum, from informal networks of people with autism and/or their parents, carers or partners sharing information and support, up to formalised hub services with professional staff and their own physical premises. Services vary in terms of what they offer 'in house'. Some services signpost and facilitate access to support provided elsewhere – including both *ad hoc* local services and diagnosis-driven services offered in a clinical context which aim to provide signposting, information and support to people receiving a diagnosis.

Others may provide a substantial range of services themselves, or have well-established relationships with other service providers.

The 2014 Adult Autism Strategy 'Think Autism'[1] discusses 'low-level interpersonal support' in terms of enabling adults with autism to access social networks, advice and information, giving the example of Matthew's Hub – a 'one stop shop' based in Hull that provides this kind of support for people with HFA and helps them access statutory services.

Of the three case studies presented in this report, Leeds AIM most closely fits this conceptualisation of 'low-level interpersonal support'. It provided advice, mentoring, and information with strong voluntary support and signposted to relevant statutory services for direct intervention if needed. Employment support (e.g. short coaching appointments, help with completing employment profiles), was also offered, but this was less intensive than the supported employment evaluated in the research literature (which often involved dedicated caseworkers).

Unlike Leeds AIM, Worcester Rainbow Autism directly provided specialist counselling, diagnosis and needs assessment within its Hub service. This was a case of a predominantly 'low-level' supportive service overlapping with statutory service provision. This was reflected in the fact that these services have received limited amounts of local authority or CCG funds earmarked for their work around health and social care.

'Low-level interpersonal support' as described by Think Autism[1] would initially seem to exclude the more resource intensive clinically-driven multidisciplinary specialist services provided by a service such as BASS. However, much of their post-diagnostic group-based 'advice service' support actually appears to overlap with the predominately low-level Leeds/Hull models.

Though several of the 'low-level' service providers characterise their role as involving 'coordination' of networks, signposting, advice, and advocacy services, many are not bound by any statutory responsibility for ensuring continuity of care for individuals as characterised by care-coordination or case management approaches. In fact, 'hub-type' service providers have described the intermittent nature of contact with many service-users as a possible benefit, as users are able to choose whether to maintain or end contact with the service. However, it is not clear how the presence of local low-level interpersonal support influences statutory responsibilities in practice. An adult with HFA referred for low-level support from Mental Health services is likely to have their ongoing care coordinated through Care Plan Approach (CPA) arrangements, but it is less clear how this would work for adults with no previous engagement with statutory services who self-refer for low-level support. In this situation, staff providing low-level services might be jointly responsible (with the service-user) for the decision to engage statutory services at all.

Overall, even with the limited information collected as part of this mapping exercise, it is clear that these superficially similar models of service delivery differ from one another in terms of their objectives, staffing, costs and procedures. A more in-depth investigation of the different service models is currently being undertaken.[55] This study is comparing the impact of different service models on the lives of those accessing services, on costs, and on service-user experiences. The study aims to generate evidence to inform and support

decision-making on commissioning and developing specialist autism teams for adults with high-functioning autism and Asperger's Syndrome. The report will be published in December 2018.

6. Overall synthesis, research recommendations and conclusions

6.1 Comparison of service mapping and systematic review: programme content

We identified several areas of current practice to which at least some research evidence corresponds. Employment support, for example, is widely implemented in practice and is underpinned by research evidence. In both research and practice, these interventions include components such as liaison with employers, job coaching, work placements and support with interviews. Skills training focusing on social interaction, communication and relationships is also prevalent in terms of current practice and is underpinned by some research evidence (although it is unclear to what extent UK practitioners have taken up the formal, manualised programmes, such as PEERS, which are the focus of the higher-quality research evidence, as opposed to more informal types of training).

However, we also identified some obvious divergences between current practice and the research literature. Some strategies which have received considerable attention from researchers have not been widely taken up in practice (particularly 'high-tech' approaches using computer-based education or Virtual Reality (VR) environments). More importantly, many strategies that are of central importance in current practice have very little or no underpinning research evidence including:

- skills training other than social skills, for example relating to life skills (safety, money management etc.), literacy and numeracy, or health
- training for professionals or families, or other interventions for families and carers of adults with HFA
- individualised or person-centred support, including general social and emotional support
- mentoring
- information and advice (with the exception of skills training programmes including information about autism)
- advocacy
- peer support
- hubs or drop-in centres
- collaboration or liaison between services

It should be noted that our focus was exclusively on interventions evaluated in adults with HFA and there may be evaluations of these interventions in related populations (e.g. ASD with learning disability), the results of which might be generalisable.Table 5 shows the components identified in the service mapping for which we found potentially relevant research evidence in the systematic review. In many cases, there was insufficient detail from the service mapping to ensure that the components described are similar to those evaluated in the research studies, and the approaches used may diverge even within categories.

Table 5: Relationship between practice components and published research evidence

Practice component	Relevant evidence	Notes
Training or teaching – social skills, communication, relationships	All under 'social skills training and psychoeducation'	Practice does not necessarily include formalised training programmes
Training or teaching – safety	Saiano 2015 (one-group)[38]	
Training or teaching – literacy / numeracy, healthy living, living in the community	None	
Autism awareness training for professionals	None	
Training for families	None	Family involvement in some social skills training programmes
Employment support - general	Hillier 2007b (one-group)[25] Mavranezouli 2014 (economic)[14] Mawhood 1999 (nRCT)[33]	Range of strategies in practice including intensive caseworker support (similar to Mawhood 1999 / Mavranezouli 2014)
Employment support – interview support	Morgan 2014 (RCT)[34] Smith 2014 (RCT)[39, 40] Strickland 2013 (RCT)[41]	Practice probably not as formalised or education-focused as research
Employment support – internships and work experience	Gal 2015 (one-group)[20] Wehman 2014 (RCT)[43]	
Individualised support	None	
Support relating to care eligibility assessments	None	
Mentoring – academic	Ford 2009 (qualitative)[45] Koegel 2013 (one-group)[31] Ness 2013 (one-group)[35]	
Mentoring – other	None	
Information and advice	None	Some social skills programmes included general information about autism
Signposting	None	
Advocacy	None	
Peer support	Jantz 2011 (qualitative)[48] MacLeod 2007 (qualitative)[49]	Qualitative evidence
Hub services	Marwick 2007 (qualitative)[50] Ridout 2011 (qualitative)[51]	Qualitative evidence
Social / leisure activities	Hesselmark 2014 (RCT; comparison group)[23]	
Support for carers and families	None	

Outreach services	None	
Social enterprises	None	
Health professional involvement and MDTs	National Audit Office 2009 (economic)[15]	
Assistive technologies	Gentry 2015 (RCT)[22] Smith 2014 (RCT)[39, 40] Kandalaft 2013 (one-group)[29] Saiano 2015 (one-group)[38]	

6.2 Reasons for the evidence-practice discrepancy

Most of the low-level support services identified in the service mapping have a broad aim of delivering emotional and practical support in a flexible, person-centred way, to empower individuals to deal with a range of needs and challenges which vary over time. More specific strategies, such as employment support, are provided within this broader framework, when a need is identified. Service users appear to prefer these broad-based, responsive models of service delivery. However, most of the research studies focus exclusively on narrower strategies and do not address the broader context of how services are provided. Moreover, the research studies tend to focus on the more directive and less responsive type of interventions. With the exception of some of the studies evaluating supported employment, the research evidence does not appear to reflect the person-centred ethos found in practice. Most of the research studies appear to adopt a top-down model of intervention delivery, with core decisions about the aims and implementation of the programmes made by professionals. Even in those interventions that take a more participatory approach, in terms of the way the sessions are run, the overarching goals do not seem to reflect what is important to adults with autism.

Much of the research seems to be based on a 'deficit model' of autism where the goal of intervention is to mitigate or compensate for specific impairments, rather than a 'social' or 'strengths model' where the goal is to empower people to make their own choices. The latter includes supportive or responsive type interventions as identified in the service mapping. A number of practical barriers exist to evaluating more responsive services. By their nature, they cannot be standardised or assessed in terms of fidelity of implementation, unlike manualised programmes such as PEERS. They cannot be reduced to a single goal, because they aim to respond to a potentially diverse range of needs, which means it is difficult to demonstrate effectiveness on any single outcome. Where intervention goals are mainly preventive, long follow-up periods and large sample sizes are required to generate an effect, and where much of the value of the programme comes from liaison with and signposting to other services, it is difficult to isolate the effect of the former from that of the latter. In addition, due to the context of delivery of these more responsive services, they may be under less pressure than more focused interventions to produce evidence of impact.

Although some of the services identified in the mapping exercise have attempted to collect information relating to user outcomes, attempts at formal evaluation have been extremely limited. This is likely to be due to lack of resource and expertise in research design, methodology and statistical analysis needed to undertake rigorous evaluation,

compounded by the difficulties in collecting baseline and follow-up data for the HFA population.

Some service providers identified crisis prevention as being a particularly important outcome to measure because of the potential to show cost savings, but were unable to demonstrate cost-effectiveness because the putative cost savings were likely to come from a number of different budgets. The statutory guidance to support the implementation of the Adult Autism Strategy also highlights the importance of preventing crisis situations, stressing the detrimental impact on the person and the cost to local authorities and NHS bodies.

It should be noted that absence of evidence of effectiveness (and cost-effectiveness) does not imply evidence of ineffectiveness. The lack of evidence on many types of low-level support interventions should not be interpreted as showing them to be less beneficial or valuable.

6.3 Research recommendations

6.3.1 Primary research

As discussed above, there are some large gaps in the available research evidence. The more responsive and person-centred support strategies, such as peer support groups, advice and advocacy, mentoring, and models of service delivery focused on maintaining networks and coordinating support may not easily lend themselves to robust evaluation. Therefore qualitative and process evaluation may be more appropriate. However, any evaluation should be conducted by researchers not connected to the organisations delivering the service, and use appropriate methods with respect to sampling, data collection, and data analysis. Service-users should be appropriately involved, and be included as research participants, and data from programme staff and other stakeholders are likely to be relevant. Evaluation should aim to provide a rounded picture of the functioning of the service, including any barriers and facilitators. Such an approach is being taken in the "Supporting adults with High functioning Autism and asPerger syndrome (SHAPE)" project due to report in December 2018.[55] This project will investigate the different Specialist Autism Team service models that currently exist, comparing them in terms of their impact on the lives of adults accessing their services, their costs, and service-user experiences.

More generally, future research needs to better reflect the diversity of people with HFA, with respect both to demographics and to the nature of their symptoms and challenges. In particular, there is very little evidence on interventions for middle-aged and older adults, for black and minority ethnic groups and for women. Future research could explore the specific needs and priorities of these groups, and how the impact of interventions may vary between different groups (e.g. young adults and older people).

Most of the interventions identified in the systematic review had much narrower objectives than the low-level supportive models identified in the service mapping. However, it became apparent that some of these specific interventions might be accessed either directly or indirectly though low-level supportive services. Consequently, there may be some interest in both expanding and improving the evidence base around these more targeted forms of intervention.

Several types of targeted intervention would benefit from robust evaluation, ideally randomised controlled trials. Where randomised trials are not feasible, evaluators could consider including a matched comparison group, perhaps in another area, who do not access similar services. It is important to collect data from at least two time-points – once before individuals access the service, or as soon as possible after they come into contact with it, and once after they have used the service – and not just collect retrospective data as to whether people believe they have benefited. Where possible, evaluations should seek to evaluate not only short-term impact but also longer-term outcomes.

Controlled trials would be particularly valuable in areas where there is indicative, but not conclusive, evidence of benefit. For example, the evidence on supported employment is promising but fairly limited. A randomised trial of a supported employment programme, along the lines of Prospects[33], would be a useful contribution to the existing evidence. Trials of skills training around safety or independent living would also be useful. Even where trials have been conducted, and have shown evidence of benefit, as for social skills training, these tend to be small and further trials with larger sample sizes would be worthwhile. Researchers should identify existing support services offering such programmes, and aim to evaluate their work, rather than constructing entirely new interventions, unless it is known that relevant programmes are not being offered anywhere. In general, evaluation researchers would benefit from consulting more extensively with practitioners and service-users to identify promising strategies.

Most intervention research has focused on proximal outcomes, such as questionnaire measures of social skills or autism symptoms, and there is a need for future research to evaluate distal outcomes, such as mental health, wellbeing and quality of life with longer follow-up. However, most existing tools for the measurement of these outcomes have not been validated with adults with HFA (or, in many cases, with any autism spectrum populations). Instruments for the measurement of intermediate outcomes relevant to the lives of people with HFA, such as independence and activities of daily living are needed. The development and validation of such tools would be a valuable contribution to the evidence base.

We identified very few cost-effectiveness studies, despite cost-effectiveness being identified by policy-makers and practitioners as a key rationale for the delivery of low-level support services. Our searches identified only two robust economic evaluations, one of multidisciplinary teams and one of supported employment. This may be due in part to the lack of robust effectiveness studies, which means there is little reliable data to populate economic models. Further research on cost-effectiveness of interventions is needed.

6.3.2 Secondary research

Further systematic reviews of effectiveness and cost-effectiveness in this area are probably not needed. This review is sufficiently inclusive to capture all the existing intervention literature focusing on people with HFA. However, there is scope for systematic reviews of qualitative evidence focusing on the experiences and needs of people with HFA, which to our knowledge has not been systematically reviewed. Syntheses of this broader qualitative literature could inform the development of interventions as well as suggest hypotheses for future evaluation work.

Further cost-effectiveness modelling would also be useful, although the scope for this may be limited by the paucity of effectiveness data. Existing economic analyses of supported employment[14] and multi-disciplinary teams[15] represent probably the best that can be currently achieved in terms of both methods and the data available to populate the models. One possible gap concerns hub-type models of service delivery focusing on coordination and referral (see discussion on page 68 above), as opposed to the more diagnosis-led services which appear to be the focus of the National Audit Office (NAO) evaluation. Such a service could be the subject of an economic analysis using similar methods to the NAO evaluation. Such an analysis would need to take a sufficiently broad perspective to incorporate the potential long-term and preventative benefits of low-level support to individuals, and potential cost savings across a range of policy bodies.

Key research recommendations

1. Evaluations of the impact of supportive and person-centred services, such as peer support, advocacy services and drop-in centres.

2. Robust process evaluation and qualitative studies of existing support services.

3. Cost-effectiveness studies, particularly of the 'hub' model of support for people with HFA.

4. Evaluation of support services tailored to older adults, black or minority ethnic groups and women with HFA.

5. Randomised trials of more focused interventions, such as employment support and skills training, using larger samples and longer term follow-up.

6. Development and validation of 'real-world' outcome measures reflecting the priorities of people with HFA.

6.4 Conclusions

Service providers adopting a more person-centred, enabling model of practice can make use of the research evidence identified and synthesised in the systematic review. For example, many service providers already offer employment support and social skills training and the evidence supports their continued use. Where these types of intervention are not currently offered, service providers might consider making them available to people identified as having the potential to benefit from them and as part of a flexible package of supportive services.

Information gathered during the service mapping suggests that some form of referral service or network is a necessary condition for the implementation of more specific interventions, if only to provide a point of access for potential service-users. The service mapping also indicates that increased communication between practitioners and service providers could be valuable. The service providers we spoke to directly were aware of other low-level supportive services within their local regions, but not nationally. During the wider service mapping, we identified a range of local services spread around the country, often addressing similar objectives, but with differing approaches. Rather than

working in isolation, these services might benefit from sharing their experiences around concerns such as appropriate staffing, working within funding constraints, creating a sustainable service, and managing relationships with statutory and voluntary services.

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Appendices

Appendix 1: Example search strategy

The search strategy below was used for the MEDLINE database; searches on other databases used a translated version.

Database: Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) <1946 to Present>

Search Strategy:

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1 autistic disorder/ (17281)

2 asperger syndrome/ (1602)

3 (autism or autistic or asperger$).ti,ab. (29387)

4 (adult$ adj2 ASD).ti,ab. (456)

5 1 or 2 or 3 or 4 (31904)

6 (low level intervention$ or low intensity intervention$).ti,ab. (133)

7 (low level support$ or low intensity support$).ti,ab. (12)

8 Social skills/ (238)

9 "Activities of Daily Living"/ (53991)

10 Occupational Therapy/ (10812)

11 (social skill$ or life skill$).ti,ab. (4416)

12 (skill$ adj2 (independen$ or employ$)).ti,ab. (709)

13 (independen$ adj2 (live or lives or living)).ti,ab. (3893)

14 ((promot$ or encourage$ or support$ or enhanc$ or increas$) adj2 (empathy or socialization or socialisation or interaction or friend$)).ti,ab. (10865)

15 ((promot$ or encourage$ or support$ or enhanc$ or increas$) adj2 (independen$ or engagement or involvement or inclusion or participation)).ti,ab. (26527)

16 ((reduc$ or decreas$ or discourag$ or prevent$ or lessen) adj2 (isolation or dependenc$ or loneliness)).ti,ab. (3681)

17 Self care/ (25987)

18 Self-Help Groups/ (8170)

19 (self help or selfhelp or self care or selfcare or support group$).ti,ab. (21770)

20 Social Participation/ or Friends/ (3983)

21 (social activit$ or social group$ or social involve$ or social inclusion or social network$ or social participat$).ti,ab. (19163)

22 (community activit$ or community group$ or community involve$ or community inclusion or community network$).ti,ab. (3459)

23 (games or leisure or sport or sports or hobby or hobbies or club$).ti,ab. (74912)

24 exp Leisure Activities/ (179407)

25 community networks/ or social support/ (61301)

26 Mentors/ (8323)

27 (support$ or coach$ or mentor$ or befriend$ or broker$ or advise$ or advisor$ or buddy or buddies or facilitat$ or outreach).ti,ab. (1467410)

28 Patient Advocacy/ (22884)

29 (advocacy or advocate$).ti,ab. (48840)

30 (access adj2 (service$ or facilities or resources or activities or advice)).ti,ab. (4712)

31 (liaison adj services).ti,ab. (198)

32 (information adj2 (service$ or benefit$ or provid$ or provision or give or gives or giving or gave)).ti,ab. (138037)

33 (advice adj2 (service$ or benefit$ or provid$ or provision or give or gives or giving or gave)).ti,ab. (4704)

34 "advice and information".ti,ab. (272)

35 exp Self Concept/ (78463)

36 (Well being or wellbeing).ti,ab. (52818)

37 ((promot$ or encourage$ or support$ or enhanc$ or increas$) adj2 (self esteem or selfesteem or self-esteem or self confiden$ or selfconfiden$ or self-confiden$ or resilient$ or resiliency or confident$ or confidence)).ti,ab. (6161)

38 person centred approach.ti,ab. (136)

39 Patient-Centered Care/ (12555)

40 Caregivers/ (24263)

41 ((Carer$1 or caregiv$ or caretaker$ or care taker$ or custodian$ or guardian$ or family or families or father$ or mother$ or parent$ or sibling$ or brother$ or sister$ or spouse$ or wife$ or husband$ or partner$ or peer or peers or friend$ or online or neighbour$) adj2 (group$ or support$ or network$)).ti,ab. (41575)

42 (peer adj2 (training or mediat$ or advoca$)).ti,ab. (528)

43 Employment/ or Employment, Supported/ (39330)

44 ((employ$ or work or workplace or job or vocational) adj2 (train$ or prepar$ or opportunit$ or skill$ or rehabilitat$ or support$ or placement$ or interview$ or search$ or competitive$)).ti,ab. (22258)

45 "individual placement and support".ti,ab. (173)

46 (vocational adj (independence or engagement)).ti,ab. (15)

47 (autism adj3 champion$).ti,ab. (0)

48 ((money or financ$) adj2 (manag$ or advice)).ti,ab. (2211)

49 Public Assistance/ (2625)

50 (benefit$ adj2 (payment$ or advice or welfare)).ti,ab. (663)

51 ((housing or tenancy or tenant$ or accommodation) adj2 (advice or support$)).ti,ab. (702)

52 ((support$ or mentor$) adj2 (universit$ or college$)).ti,ab. (374)

53 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or 52 (2158008)

54 5 and 53 (6985)

55 exp adult/ or middle aged/ or young adult/ (5977614)

56 (adult$ or men or women or man or woman or worker$ or employee$).ti,ab. (2240431)

57 (people or person$).ti,ab. (744455)

58 55 or 56 or 57 (7234915)

59 54 and 58 (2717)

60 exp animals/ not humans.sh. (4135218)

61 59 not 60 (2662)

Appendix 2: Quality Assessment tool for effectiveness studies

The tool contains six questions:
1. Selection bias
2. Study design
3. Confounders
4. Blinding
5. Data collection
6. Withdrawals and dropouts.

Each question can get an A (high), B (medium) or C (low) quality rating, as per the tool below. The overall rating for the study is then calculated on the following basis:

A = A for q2 and A/B on at least two of qq1,3,6;
B = A for q2 and A/B on one of qq1,3,6; or B for q2 and A/B on at least two of qq1,3,6;
C = A for q2 and C for all of qq1,3,6; or B for q2 and A/B on less than two of qq1,3,6.

The guidelines for the specific questions are as follows.

1. Selection bias

Selected study sample very likely to represent population from target area AND 80 to 100% response at baseline	A
Selected study sample very likely to represent population from target area AND 60 to 79% response at baseline; OR Selected study sample somewhat likely to represent population from target area AND 80 to 100% response at baseline	B
<60% baseline response; OR Somewhat likely to represent population AND <80% response; OR Not likely to represent population OR representativeness not reported/unclear; OR Response rate at baseline not reported/unclear	C

2. Study design

Control group	A
No control group	B

3. Confounders

Control group matched on key variables (e.g. gender, age, IQ, autism symptoms) AND supporting data presented; OR Outcomes adjusted for key variables using appropriate methods	A

Stated that control group matched or 'similar', but supporting data not presented	B
No matching or adjustment reported AND likely to be substantial differences between groups; OR no information on differences between intervention and control group; OR no control group	C

Note: RCTs will be graded 'B' if no information on between-group differences is presented

4. Blinding

Outcome assessors blind to allocation	A
Blinding not reported; OR no control group	B

5. Data collection

Piloting or pre-testing of tool; OR checks on validity of data (e.g. verification of a percentage of responses); OR tool shown to be reliable in relevant population	A
Data collection tool based on previous research, but no piloting or checking, and reliability not demonstrated	B
Data collection unclear; OR tools not piloted, checked or based on previous research	C

6. Withdrawals and dropouts

Attrition <20%	A
Attrition 21%-40%	B
Attrition >40% OR not reported	C

Note: Attrition is measured as the percentage of the baseline sample lost at final follow-up

Appendix 3: Quality Assessment tool for economic studies

Study design

1. Was the research question stated?

2. Was the economic importance of the research question stated?

3. Was/were the viewpoint(s) of the analysis clearly stated and justified?

4. Was a rationale reported for the choice of the alternative programmes or interventions compared?

5. Were the alternatives being compared clearly described?

6. Was the form of economic evaluation stated?

7. Was the choice of form of economic evaluation justified in relation to the questions addressed?

Data collection

8. Was/were the source(s) of effectiveness estimates used stated?

9. Were details of the design and results of the effectiveness study given (if based on a single study)?

10. Were details of the methods of synthesis or meta-analysis of estimates given (if based on an overview of several effectiveness studies)?

11. Were the primary outcome measure(s) for the economic evaluation clearly stated?

12. Were the methods used to value health states and other benefits stated?

13. Were the details of the subjects from whom valuations were obtained given?

14. Were productivity changes (if included) reported separately?

15. Was the relevance of productivity changes to the study question discussed?

16. Were quantities of resources reported separately from their unit cost?

17. Were the methods for the estimation of quantities and unit costs described?

18. Were currency and price data recorded?

19. Were details of price adjustments for inflation or currency conversion given?

20. Were details of any model used given?

21. Was there a justification for the choice of model used and the key parameters on which it was based?

Analysis and interpretation of results

22. Was time horizon of cost and benefits stated?

23. Was the discount rate stated?

24. Was the choice of rate justified?

25. Was an explanation given if cost or benefits were not discounted?

26. Were the details of statistical test(s) and confidence intervals given for stochastic data?

27. Was the approach to sensitivity analysis described?

28. Was the choice of variables for sensitivity analysis justified?

29. Were the ranges over which the parameters were varied stated?

30. Were relevant alternatives compared? (i.e. Were appropriate comparisons made when conducting the incremental analysis?)

31. Was an incremental analysis reported?

32. Were major outcomes presented in a disaggregated as well as aggregated form?

33. Was the answer to the study question given?

34. Did conclusions follow from the data reported?

35. Were conclusions accompanied by the appropriate caveats?

36. Were generalisability issues addressed?

Appendix 4: Quality Assessment tool for qualitative studies

1. Abstract and title: Did they provide a clear description of the study?

Good Structured abstract with full information and clear title.

Fair Abstract with most of the information.

Poor Inadequate abstract.

Very Poor No abstract.

2. Introduction and aims: Was there a good background and clear statement of the aims of the research?

Good Full but concise background to discussion/study containing up-to-date literature review and highlighting gaps in knowledge. Clear statement of aim AND objectives including research questions.

Fair Some background and literature review. Research questions outlined.

Poor Some background but no aim/objectives/questions, OR Aims/objectives but inadequate background.

Very Poor No mention of aims/objectives. No background or literature review.

3. Method and data: Is the method appropriate and clearly explained?

Good Method is appropriate and described clearly (e.g., questionnaires included). Clear details of the data collection and recording.

Fair Method appropriate, description could be better. Data described.

Poor Questionable whether method is appropriate. Method described inadequately. Little description of data.

Very Poor No mention of method, AND/OR Method inappropriate, AND/OR No details of data.

4. Sampling: Was the sampling strategy appropriate to address the aims?

Good Details (age/gender/race/context) of who was studied and how they were recruited. Why this group was targeted. The sample size was justified for the study. Response rates shown and explained.

Fair Sample size justified. Most information given, but some missing.

Poor Sampling mentioned but few descriptive details.

Very Poor No details of sample.

5. Data analysis: Was the description of the data analysis sufficiently rigorous?

Good Clear description of how analysis was done. Description of how themes derived/respondent validation or triangulation.

Fair Descriptive discussion of analysis.

Poor Minimal details about analysis.

Very Poor No discussion of analysis.

6. Ethics and bias: Have ethical issues been addressed, and what has necessary ethical approval gained? Has the relationship between researchers and participants been adequately considered?

Good Ethics: Where necessary issues of confidentiality, sensitivity, and consent were addressed. Bias: Researcher was reflexive and/or aware of own bias.

Fair Lip service was paid to above (i.e., these issues were acknowledged).

Poor Brief mention of issues.

Very Poor No mention of issues.

7. Results: Is there a clear statement of the findings?

Good Findings explicit, easy to understand, and in logical progression. Tables, if present, are explained in text. Results relate directly to aims. Sufficient data are presented to support findings.

Fair Findings mentioned but more explanation could be given. Data presented relate directly to results.

Poor Findings presented haphazardly, not explained, and do not progress logically from results.

Very Poor Findings not mentioned or do not relate to aims.

8. Transferability or generalisability: Are the findings of this study transferable (generalisable) to a wider population?

Good Context and setting of the study is described sufficiently to allow comparison with other contexts and settings, plus high score in Question 4 (sampling).

Fair Some context and setting described, but more needed to replicate or compare the study with others, PLUS fair score or higher in Question 4.

Poor Minimal description of context/setting.

Very Poor No description of context/setting.

9. Implications and usefulness: How important are these findings to policy and practice?

Good Contributes something new and/or different in terms of understanding/insight or perspective. Suggests ideas for further research. Suggests implications for policy and/or practice.

Fair Two of the above.

Poor Only one of the above.

Very Poor None of the above.

Appendix 5: Quality Assessment of economic studies: results

	Howlin 2005	Mavranezouli 2014	National Audit Office 2009
1.	N	Y	Y
2.	Y	Y	Y
3.	N	Y	Y
4.	N	Y	N
5.	N	N	N
6.	N	Y	Y
7.	N	Y	Y
8.	Y	Y	Y
9.	N	Y	N
10.	N/A	N/A	N/A
11.	Y	Y	Y
12.	N	Y	N
13.	N	Y	N
14.	N/A	N/A	Y
15.	N	N	Y
16.	N	Y	Y
17.	N	N	Y
18.	N	Y	Y
19.	N	Y	Y
20.	N	Y	Y
21.	N	Y	Y
22.	N	Y	Y
23.	N	Y	N
24.	N	Y	N
25.	N	Y	Y
26.	N/A	N/A	Y
27.	N	Y	Y
28.	N	N	Y
29.	N	Y	Y
30.	N	Y	Y
31.	N	Y	Y
32.	N	Y	Y
33.	N	Y	Y
34.	Y	Y	Y
35.	N	Y	Y
36.	N	Y	N

Y=Yes, N=No, N/A=not applicable

Appendix 6: Advisory Group members

Ian Dale (National Autistic Society)
Jane Hambleton (S Staffs & Shropshire NHS Foundation Trust)
Sara Heath (Autonomy Shropshire)
Eric Heath (Autonomy Shropshire)
Peter Hopkins (Shropshire and Telford Asperger Carers' Support)
Tim Nicholls (National Autistic Society)
Zandrea Stewart (Association of Directors of Social Services)
Michael Swaffield (Department of Health)
Alison Tingle (Department of Health)
Anita Wadhawan (Department of Health)
Marion Youens (A4U Shropshire)

Appendix 7: Summary table of outcomes

The table overleaf shows a summary of the findings from the effectiveness studies. The studies are categorised in the same groups used for the "Results" section in the text above. The columns show the outcomes used in the studies. Arrows show whether the results were positive (up arrow), adverse (down arrow) or mixed/no change (square) and the statistical significance of the finding (black = statistically significant, grey = not statistically significant or not reported). For studies using controlled designs (RCT or nRCT), the findings reflect the comparison of intervention and control group; for studies using uncontrolled designs, the findings reflect the comparison of pre and post.

Where results were reported only for subdomains and not as an overall score for the outcome, the arrow is shown as up (resp. down) if two-thirds or more of the subdomains were positive (resp. adverse). The arrow is shows as black if a majority of the subdomains were statistically significant.

The table thus provides an indication of both what measures were used in the studies, and the direction of effect observed.

						Autism symptoms / empathy / etc.				Quality of life / wellbeing					Mental health								Social support / quality of social life						Social skills (questionnaire)							Service use		Other employment							Miscellaneous							
Intvn type	Item ID	Short Title	Design	Quality rating	Sample size	Social Responsiveness Scale	Autism Spectrum Quotient	Empathy Quotient	Emotional Empathy Scale	Personal Wellbeing Index	Quality of Life Inventory	Heidelberger State Inventory	Rosenberg Self-Esteem Scale	Quality of Life Q	Sense of Coherence (Antonovsky)	Outcome Q	Symptom Checklist 90	Adult ADHD Self-Report Scale	Beck Depression Inventory	State-Trait Anxiety Inventory	Clinical Global Impression Scale	Patient Health Q - Depression	Social Provisions Scale	Quality of Socialization Q	Index of Peer Relations	Socialization satisfaction	Social and Emotional Loneliness Scale	Observed social / interview performance	Social Problem Solving Inventory	Social Skills Rating System	Vineland Adaptive Behaviour - Social	Social Communication Skills Q	E of Solution of Interpersonal Conflict	Q of Movement Therapy - social skills	Job coaching hours received	Supports Intensity Scale	Hours worked	Job performance	Job satisfaction	Employment status	Earnings	Interview confidence	Dating and Assertion Q	Adjustment to disability	Q of Movement Therapy - body awareness	Self-other awareness	N of social activities	Academic performance (grades)	Leisure-related outcomes	Safety-related
Job interview training	18438403	Morgan (2014)	RCT	A	28																	↑					↑			↑																			
	18438189	Smith (2014)	RCT	A	26																						↑												↑										
	18438563	Strickland (2013)	RCT	A	22																						↑																						
Employment support	18438242	Gentry (2015)	RCT	A	50																													↑	↓		↑													
	18438474	Wehman (2014)	RCT	A	40																														↑				↑										
	18442504	Mawhood (1999)	NRCT	A	50								↓																										↑	↑									
	18440422	Gal (2015)*	1-G	C	25					■				■																																		
	18444904	Hillier (2007b)	1-G	C	9																																■	↓	↑	↑									
Social skills training and psycho-education	18446198	Hesselmark (2014)	RCT†	A	68		↑				↑		↑		↑		↑	↑	↓		■																												
	18442893	Laugeson (2015)	RCT	A	22	↑		↑																↑						↑																			
	18438876	Gantman (2012)	RCT	A	17	↑		↑																↑			↑			↑																			
	18439502	Turner-Brown (2008)	RCT	A	11																						↓				↑																		
	18438036	Bonete (2015)	NRCT	A	100																									↑		↑					↑											
	18439019	Palmen (2011)	NRCT	A	12																																											↑	
	18444057	Hillier (2011)	1-G	C	49														↑	↑					↑																							
	18442970	Cunningham (2015)	1-G‡	A	38	↑	↑	↑															↑																			↑					
	18441162	Eack (2013)	1-G	B	14																					↑																	↑				
	18444990	Hillier (2007a)	1-G	C	13		↑	↑																	↑																						
	18442503	Howlin (1999)¶	1-G	C	10																						↑																					
	18438732	Kandalaft (2013)	1-G	C	8																						↑																					
	18988648	Pugliese (2013)	1-G	C	5											↑													↑																			
	18440733	White (2015)	1-G	C	5																						↑																					
Music/ dance	18438040	Koch (2015)	NRCT	A	31				↑			↑																						↑									↑	↑					
	18443694	Hillier (2012)	1-G	C	22								↑							↑					↑																							
University students	18443478	Koegel (2013)	1-G	C	3																					↑																			↑	↑			
	18443487	Ness (2013)	1-G	B	3																																								↑			

Safety	18438032	Saiano (2015)	1-G	C	7																																													↑

Abbreviations: E=evaluation, Q=questionnaire

*For Gal, results refer to 3-month follow-up, not 9-month

† Hesselmark compares two interventions ((1) group CBT and (2) leisure programme); results have been interpreted as (1) against (2), but both interventions are relevant

‡ Cunningham has two groups, but only reports full data for the pooled results, so is interpreted here as one-group

¶ For Howlin, only ‘appropriate / inappropriate utterances’ outcomes (N=4) considered here

Appendix 8: Evidence tables

Effectiveness studies

Bonete 2015

Research question or focus	To evaluate the effectiveness and feasibility of a group interpersonal problem-solving intervention for workplace adaptation for young people and adults with Asperger's
Country of study	Spain
Sampling methods and eligible population	Intervention group. Criteria: confirmed Asperger's diagnosis; no major psychiatric comorbidities. No information on sampling as such. Comparison group. Students from high schools and university, "selected randomly" but also matched for gender, age and IQ. Criterion: "no history of injury or illness involving the brain" (p412).
Recruitment methods	For intervention group, "members of AS associations in various Spanish cities were encouraged to participate voluntarily" (p412). For comparison group, by open invitation letter or email (to parents for those under 18).
% participation rate	NR
Sample demographics at baseline	Intervention: 86% male, age 16-29, mean IQ 96 (Reynolds), mean nonverbal IQ 48. 42% had 'good outcome' = were either employed or had completed higher education or training, and lived independently or had group of friends; 44% 'fair' = either higher education or one close friend; 14% lacked both. Control: 86% male, mean age 20, mean nonverbal IQ 52.
Sample size	100 (50 intervention, 50 comparison)
Design	Non-randomised controlled. (Comparing group of Asperger's participants to group without ASC. Outcomes for comparison groups measured at one time point only.)
Intervention description	Intervention initially piloted with four participants in previous pilot study. "In general terms, the intervention consisted of 75-minute sessions, delivered once a week over a 10-week period to groups of four to six people with ASDs assisted by a therapist. Being a programme specifically developed for the ASD population, it takes into account particular difficulties and strengths of this population. A mediational approach was adopted for learning, and the therapist's aim was to provide the participants with the necessary clues to understand and verbalise, session by session, the phases regarding the solution of interpersonal problems. Through sequential training in a cognitive and metacognitive process, the programme focuses on the interpersonal problem-solving process by working on a phase during each session: (1) introduction to interpersonal problem-solving skills and description of AS's characteristics; (2) conversational skills; (3) defining a problem; (4) different points of view; (5) thinking of causes; (6) generating solutions; (7) considering consequences and choosing the best option; (8) plan of action; (9) evaluating actions and facing failures; and (10) reviewing the process. The content of each session focuses on one particular phase of the process supported by examples on common interpersonal problems that take place in a work environment in combination with participant personal

	experiences. Appendix 1 provides an overview of the 10-session intervention. At the end of each session, two homework tasks were given concerning the step-by-step resolution of two interpersonal problems. They related to short narratives involving an interpersonal problem (in a workplace context) to be solved in phases (see Appendix 2). At the end of the programme, participants received a portfolio with their homework and a few templates for new interpersonal problem situations to be added as needed in the future." pp412f
Comparator description (if applicable)	No intervention
Method of allocation (if applicable)	Groups were recruited separately, with comparison participants selected for matching
Baseline comparisons (if applicable)	Groups matched on gender, age and IQ. No sig diff on educational level.
Data collection methods	Assessment of Social Problem Solving Task ((Evaluación de Solución de Conflictos Interpersonales (ESCI)): questions around interpersonal conflict with three subdomains: emotion, situational concordance and solutions. For ESCI and O-AFP, stated that they were completed at "a final group session" but no other details reported. Vineland Adaptive Behavior Scale (VABS) - social subscale (parent report for both intervention and control group) Osnabrück Ability to Work Profile (O-AFP). Assessment of work capabilities, completed both by work supervisor and by participants. Three subdomains: learning ability, social communication and interactional competence, and social adaptation and motivation.
Analysis methods	ANOVA; Reliable Change Indices for clinical significance (only partly reported). (Note that outcomes in control group were only measured once; the effect size was calculated by comparing pre and post scores from the int group to this single score from the comp group.)
Follow-up period	At end of 10-week intervention (there was also a 3-month follow-up, but this did not use any pre-post measures)
Results (effectiveness)	VABS-S Total int pre 155.63 post 167.92, comp 191.7*. VABS-S Relations subscale int pre 61.28 post 65.78, comp 74.50*. VABS-S Leisure subscale int pre 51.81 post 53.71, comp 60.82*. VABS-S Coping subscale int pre 41.92 post 49.57, comp 56.82*. ESCI Total int pre 54.42 post 60.89, comp 65.28*. ESCI Emotion subscale int pre 11.54 post 11.56, comp 12.76. ESCI Situational Concordance subscale int pre 31.84 post 34.10, comp 36.80*. ESCI Solutions subscale int pre 11.05 post 15.22, comp 15.73*. O-AFP self-report int pre 83.21 post 85.27, comp 93.18. O-AFP supervisor report int pre 79.61 post 85.00 (not collected from comparison group). (*$p<0.05$)
Results (other)	“The parents of the 32 participants completed the Programme Satisfaction Survey (this questionnaire was not offered to the first three groups run). In general, participants seemed to be satisfied with what they learned from the programme (M = 33.74, SD = 11.48). The highest score was achieved for items *I get on better*

	with my group peers, I learnt to think about what could be the causes of negative feelings in others or problems and *I am more conscious to pay attention to others' feelings*. The item with the lowest rate was *Now, I start more conversations about topics which are interesting for others even if they are not for me*. A total of 48 participants and 47 parents answered the 3-month follow-up questionnaire. As a group, participants reported a medium change (a score of 3) on the majority of items except for *Having a written plan of action helps me to cope with interpersonal problems, Using the portfolio to solve problems* and *Family interactions have become better*. However, change was reported for better relations with friends and less problems with others. In general, all parents reported that they observed change on items such as *Solving problems more efficiently, Better definition of problems, Family interactions have become better, Better reactions with friends* and *Less problems with others*. Some change (scoring 2) was also reported for *Improving in generating solutions* and *Thinking about consequences before acting*. Overall, 100% of the participants and parents agreed that intervention should be funded by a public or private enterprise and all of them recommended the programme for someone with their condition. Summarising the participants' responses to the open-ended questions, most parents reported feeling that the programme was too short and more sessions would have improved outcomes. Furthermore, they said that a simultaneous guide for parents would have been useful to continue practicing with their children at home. Participants agreed that homework tasks were hard to do but were needed to improve their knowledge in the interpersonal problem-solving process." (pp414f)
% attrition rate	4% (2/50) in int group (N/A for comp group)
Limitations identified by author	Only self- and parent-reported measures, not direct measures of skill acquisition. Generalisability to natural settings unclear. Motivation was different between participants and parents [?]. Evaluators were not blind. Not randomised study.
Limitations identified by reviewer	Comparison group only measured at one time point, and were not comparable, so difficult to interpret results in comparative terms.
Study funding	University of Granada

Cunningham (2015)

Research question or focus	To evaluate the effectiveness of a relationship enhancement programme for adults with ASD
Country of study	USA (Florida)
Sampling methods and eligible population	Participants sampled from contacts of a state-funded agency supporting people with ASD, families and professionals (with approx. 900 service users). Inclusion criteria: diagnosed ASD (including Asperger's and PDD-NOS); ≥18 years and legal capacity to consent; average or above-average cognitive skills and at least 10th-grade reading level; reported interest in dating or marriage; willing and motivated to participate.
Recruitment methods	"Recruitment flyers were created and emailed to potential participants and local professionals registered with the agency.

	Interested parties were asked to call or email for informal questions and answers and to screen interested contacts. A preliminary questionnaire to determine interest in a program to enhance romantic relationships was conducted over the phone." (p57) Participants provided informed consent.
% participation rate	65% (N=69 made contact, of whom N=16 were ineligible and N=8 were eligible but did not commence intervention).
Sample demographics at baseline	79% male; 66% Caucasian, 21% Hispanic, 3% African American, 2% Asian, 2% other; 76% age 18-29; 71% at least some college education; 92% single.
Sample size	N=38 in full analysis
Design	Non-randomised controlled
Intervention description	Relationship Enhancement programme using the "Ready for Love" manual. Two hours/week for 8 weeks. RE "is a psychoeducational treatment and brief therapy model which involves skill training of both singles and couples to empower them to resolve current and future relationship conflict ... The skills taught in RE include Showing Understanding, Expression, Discussion, Coaching, Conflict Management, Problem Solving, Self-Change, Helping Others Change, Generalisation and Maintenance." (p8) The study compares the standard RE curriculum to one specially adapted for people with ASD which "included components specifically designed to help prepare these adults with ASD with social skills for starting a conversation, flirting and asking someone out on a date." No information on detailed content, or on delivery.
Comparator description (if applicable)	The study compares the standard RE curriculum to one specially adapted for people with ASD.
Method of allocation (if applicable)	Somewhat unclear. Researcher randomly assigned two arms to available locations and time slots before allocation, but participants' allocation to groups was based on convenience of location and timing. NR whether participants knew which group was which. Also of two locations, RE and RE-ASD were both provided in one, RE only in the other, so all participants in that location were assigned to RE by default. (Also note that most analyses are pooled one-group pre-post analyses and full comparative data are not reported.)
Baseline comparisons (if applicable)	Data reported on gender, ethnicity, age, education and relationship status, but sig tests NR
Data collection methods	All self-report questionnaires: Social Responsiveness Scale-2 (SRS-2) Autism Spectrum Quotient (AQ) Dating and Assertion Questionnaire (DAQ) Empathy Quotient (EQ) Social Provisions Scale (SPS)
Analysis methods	Study powered at 0.80 for effect size of 0.96. Replacement by means for missing data. T-tests with Bonferroni correction, ANOVA
Follow-up period	At end of intervention (8 weeks from baseline)
Results (effectiveness)	Within-group changes pre-post (RE and RE-ASD pooled): SRS-2 overall score pre 65.37 post 62.78* [note decreased score = reduced severity of symptoms], AQ pre 26.89 post 25.84, DAQ Dating domain pre 5.15 post 5.63*, DAQ Assertion domain pre 5.72 post 5.97, SRS-2 Social Awareness subscale pre 58.41 post 57.97,

	SRS-2 Social Cognition subscale pre 64.00 post 61.32, SRS-2 Social Communication subscale pre 63.22 post 60.49*, SRS-2 Social Motivation subscale pre 64.19 post 60.11*, SRS-2 Restricted Interests and Repetitive Behaviors subscale pre 68.76 post 64.27*, EQ pre 29.97 post 33.39* [no sig diff between males and females], SPS pre 72.63 post 74.38. (* p<0.05). For between-group differences post-test comparisons were made (not comparisons of change over time), but full data are not reported, only the results of sig testing: there were no sig diffs on any variable (SRS-2 overall, AQ, DAQ Dating, DAQ Assertion, EQ, SPS).
Results (other)	None (there was an open question in the post-test questionnaire (p96) but results NR)
% attrition rate	11% (5/45 who commenced intervention did not complete; not counting a further N=2 excluded from analyses due to incomplete data).
Limitations identified by author	Convenience sample may not be representative of broader ASD population as they were already actively seeking assistance from agency. Researcher employed by agency through which participants sampled. Limited ability to recruit non-English-speaking people. All outcomes were self-report.
Limitations identified by reviewer	Limited description of intervention content or delivery. Allocation not random or quasi-random and may have been influenced by participants. Results of the analyses comparing the two groups are not presented in full, so most of the data can only be interpreted as one-group.
Study funding	NR

Eack (2013)

Research question or focus	To assess the feasibility, acceptability, and potential efficacy of cognitive enhancement therapy for adults with ASD
Country of study	USA
Sampling methods and eligible population	Participants drawn from support groups, community colleges and universities, previous research studies, specialty clinics, and local advocacy groups. Inclusion criteria: met criteria for autism or ASD autism spectrum disorder on the Autism Diagnostic Observation Schedule; met autism cut-offs on the Autism Diagnostic Interview-R; age 18–45; IQ ≥80 Wechsler; no substance abuse in previous 3 months; no behavioural problems that might negatively affect other participants; cognitive and social disability as measured by Cognitive Style and Social Cognition Eligibility Interview.
Recruitment methods	NR
% participation rate	N=25 total made initial contact; N=6 did not meet inclusion criteria, N=5 met criteria but did not participate. So 56% of all contacted, 74% of those meeting criteria
Sample demographics at baseline	Mean age 25.3, 86% male, 100% Caucasian, 86% at least some college, mean IQ 118, 50% employed
Sample size	N=14
Design	One-group uncontrolled
Intervention description	Cognitive Enhancement Therapy. Focused on cognitive impairments – originally developed for schizophrenia but adapted for ASD for

	this study. Initial phase (60 hours) of cognitive training, limited relevance for this review. Then social-cognitive group education programme (45 sessions, 1.5h, weekly) focussing on social interactions, perspective-taking, appraising novel social contexts and managing emotions. Generalisation is facilitated through homework and exercises and individually tailored treatment plans. Group sessions also "provide secondary socialization opportunities to participants (e.g., learning from observing peers and coaches)". "Each CET group session is highly structured and generally includes a Welcome Back introduction to the session; a Homework Presentation that is chaired by one of the group members; a Cognitive Exercise designed to facilitate the development of social-cognitive abilities, usually involving two group members; Feedback from group members and therapists/coaches on the performance of individuals participating in the exercise; a brief Psychoeducational Lecture on a new social-cognitive topic; and a Homework Assignment based on the lecture. The CET group cognitive exercises are not computer-based, but performed in vivo centre stage in the group, and as in everyday life, purposely integrate multiple aspects of social cognition. Condensed Message is an example of a CET group cognitive exercise where participants are presented with a social problem (e.g., a son learns that his father has left his wallet at an airport restaurant), and must send a brief message (e.g., a 10-word page over the airport public address system) from one person in the scenario (e.g., the son) to the other (e.g., the father) to get the recipient of the message to act a certain way (e.g., retrieve the wallet before boarding the plane). This requires participants to identify the perspectives of both the sender and receiver of the message, including their intentions and emotions; to construct a gistful, but meaningful message that will urge the recipient to act; and to be sensitive to the social context when constructing the message (e.g., it may not be advisable to announce to the entire airport that a wallet is available). As with most CET group exercises, Condensed Message is performed in pairs, and thus participants must also work collaboratively to resolve discrepancies and arrive at a mutually agreed upon solution." (pp2870f)
Comparator description (if applicable)	N/A
Method of allocation (if applicable)	N/A
Baseline comparisons (if applicable)	N/A
Data collection methods	"Cognitive Style and Social Cognition Eligibility Interview, which included assessments of vocational ineffectiveness, interpersonal ineffectiveness, and adjustment to disability. Interview questions for these domains covered current employment, school, and household activities (vocational ineffectiveness); the quality and quantity of interactions with friends and family members (interpersonal ineffectiveness); and knowledge of autism and the ability to adapt to its challenges (adjustment to disability)"

	(pp2869f). (Also various cognitive outcomes, not in scope of this review.)
Analysis methods	T-tests on linear regression model. Intent-to-treat analysis. Expectation–maximization approach for missing data.
Follow-up period	At 9 months and 18 months from baseline (end of intervention). Note that the group psychoeducation programme started "several months" from baseline, so the timing of this component with respect to the outcome measures is unclear - it had presumably just started, or possibly not yet started, at the 9-month time point.
Results (effectiveness)	Vocational ineffectiveness baseline 3.77 9mo 3.24 18mo 2.71*. Interpersonal effectiveness baseline 4.03 9mo 3.43 18mo 2.82*. Adjustment to disability baseline 3.12 9mo 2.52 18mo 1.92* (*sig at p<0.05. NB higher scores=worse for all these outcomes.)
Results (other)	Client Satisfaction Questionnaire-8: mean total satisfaction score 3.27 out of 4.00; mean overall satisfaction score 3.57 out of 4.00; 100% “mostly satisfied” to “very satisfied”
% attrition rate	21% (3/14) at 18 months (0% at 9 months)
Limitations identified by author	Small sample size. Some improvements may be regression to the mean. Limited assessment of changes in adaptive function.
Limitations identified by reviewer	Non-comparative design. Main study focus is cognitive outcomes and there is limited detail on the tools used for the outcomes within the scope of this review.
Study funding	NIH; Autism Speaks; Department of Defense; Pennsylvania Department of Health

Gal (2015)

Research question or focus	To assess the impact on quality of life and wellbeing of a vocational-based comprehensive programme for young adults with ASD
Country of study	Israel
Sampling methods and eligible population	NR. Participants passed tests of "language, writing and visual processing abilities" before entering programme.
Recruitment methods	NR
% participation rate	NR
Sample demographics at baseline	96% male, mean age 19.1; diagnosis (by Social Communication Questionnaire) 56% Asperger’s, 8% ASD, 36% PDD-NOS; mean years education 12.3; 40% had attended mainstream high school, 40% special class within mainstream school, 16% special school, 4% dropped out of school aged 16.
Sample size	N=25
Design	One-group uncontrolled
Intervention description	Training course for first three months, followed by civilian army service working in designated job. “The aerial photography interpretation courses were designed to simulate the working environment in the army as much as possible. Each course was carried out for three months, five days a week, from 9:00 a.m. to 3:00 p.m. The courses were operated by an interdisciplinary team

	that included both army personnel and civil health and psychological professionals. Course contents were composed of two main learning domains: (1) decoding aerial photography (e.g., identifying civil infrastructure); and (2) integration within the army working environment. The latter domain focused on teaching working skills (e.g., working independently according to a checklist), Instrumental Activities of Daily Living (IADL) skills (e.g., using public transportation), communication skills (e.g., how to ask for help), social skills (e.g., how to get to know a new co-worker), self-advocacy skills (e.g., one's rights and obligations as a soldier) and how to establish hierarchal-based communication with army commanders." (p10825)
Comparator description (if applicable)	N/A
Method of allocation (if applicable)	N/A
Baseline comparisons (if applicable)	N/A
Data collection methods	Quality of Life Questionnaire (QOL-Q) Personal Wellbeing Index (PWI) No information on data collection process (presumably self-report questionnaires)
Analysis methods	Wilcoxon signed ranks tests, Friedman Test
Follow-up period	9 months from baseline (6 months from end of training course)
Results (effectiveness)	QOL Satisfaction domain pre 22.00, post1 22.36, post2 24.10*. QOL Competence/productivity domain pre 20.76, post1 19.84, post2 25.38*. QOL Empowerment/independence domain pre 24.96, post1 24.68, post2 26.14* (*p<0.05). Social belonging pre 19.28, post1 20.08, post2 19.29*. PWI Life As A Whole domain pre 7.21, post1 6.86, post2 7.73. PWI Standard Of Living domain pre 8.21, post1 7.71, post2 8.09. PWI Health domain pre 6.86, post1 6.57, post2 7.18. PWI Life Achievement domain pre 6.43, post1 6.71, post2 7.27. PWI Relationships domain pre 6.71, post1 7.00, post2 7.82. PWI Safety domain 5.93, post1 7.50*, post2 7.82. PWI Community Connectedness domain pre 6.50, post1 7.29, post2 6.91. PWI Future Security domain pre 6.57, post1 6.86, post2 7.00 (*p<0.05).
Results (other)	None
% attrition rate	21% at 9 months (3/14)
Limitations identified by author	Small sample size. No control group.
Limitations identified by reviewer	None
Study funding	NR

Gantman (2012)

Research question or focus	To evaluate the effectiveness of the PEERS For Young Adults programme for young people with high-functioning ASD

Country of study	USA (California)
Sampling methods and eligible population	Participants were recruited from The Help Group (a community mental health service offering specialist ASD services), Regional Centers, colleges and Universities, community support groups, and online research announcements. Inclusion criteria: age 18-23; diagnosis of ASD by clinical psychologist or psychiatrist; caregiver-reported social problems; motivation to participate; fluent English; family member fluent in English and willing to participate; IQ>70 Kaufman; AQ≥26; Vineland Adaptive Behavior ≤85; no history of major mental illness
Recruitment methods	NR
% participation rate	NR
Sample demographics at baseline	Mean age 20.4, 71% male; 65% Asperger's diagnosis, 24% autistic disorder, 12% PDD-NOS; 59% Caucasian, 29% Asian, 12% Hispanic/Latino. All attending college at least part-time.
Sample size	N=17
Design	RCT
Intervention description	"The UCLA PEERS for Young Adults Program consisted of 14 weekly 90 min sessions, delivered in the community. Young adults and caregivers attended separate concurrent sessions at The Help Group led by a licensed clinical psychologist and a post-doctoral psychology fellow. Research assistants, who were either graduate or undergraduate psychology students, monitored treatment fidelity, assisted with role-playing demonstrations, and provided social coaching with performance feedback during behavioural rehearsal exercises. All research assistants were trained and supervised throughout the intervention. The purpose of the lessons was to provide instruction and rehearsal of social skills related to building close relationships. Didactic lessons included: (a) conversational skills; (b) electronic forms of communication; (c) developing friendship networks and finding sources of friends; (d) appropriate use of humour; (e) peer entry strategies; (f) peer exit strategies; (g) organizing get-togethers with friends; (h) handling teasing and embarrassing feedback; (i) dating etiquette; (j) handling peer pressure and avoiding exploitation; and (k) resolving arguments with friends. … Instruction of social skills for PEERS for Young Adults was conducted in a small-group format (i.e., 9–10 group members), matching the self-reported needs and preferences of young adults with ASD …. Training on social etiquette was provided through the use of concrete rules and steps…. The presentation of social rules was conducted in the form of Socratic questioning … By using a Socratic method of instruction, young adults were essentially generating the rules and steps of social etiquette through marked direction, making it more likely that they would believe what they and their peers were learning. In order to further enhance motivation, roleplaying exercises with modelling and structured practice followed and provided context to didactic lessons, during which time participants received feedback on their performance. … group leaders provided socialization homework assignments. Homework review took place in both caregiver and young adult group sessions the following week, and individualized the program to each participant by allowing

	sufficient time to troubleshoot any problems that may have arisen. Caregivers received specific instructions on how to provide assistance with social coaching to their young adults, while promoting or maintaining their social independence." (pp1096f)
Comparator description (if applicable)	No intervention (wait-list control)
Method of allocation (if applicable)	Random, by coin flip
Baseline comparisons (if applicable)	Yes; no sig diff on age, gender, ethnicity, outcome measures
Data collection methods	Social Responsiveness Scale (caregiver report) Social Skills Rating System (caregiver report) Social and Emotional Loneliness Scale for Adults (self-report) Empathy Quotient (caregiver report) Quality of Socialization Questionnaire (caregiver report) Social Skills Inventory [but results appear to not be reported] (Also, not in scope of this review: Test of Young Adult Social Skills Knowledge)
Analysis methods	MANOVA
Follow-up period	Unclear; presume at end of 14-week intervention
Results (effectiveness)	Expressed as change scores. SELSA int -12.67, con 4.50*. SRS total int -18.7, con 6.25*. SRS social communication int -6.11, con 2.25*. SRS autistic mannerisms int -3.22, con 2.13*. SSRS social skills int 6.67, con -5.63*. SSRS cooperation int 2.56, con -1.00*. SSRS self-control int 1.22, con -2.38*. SSRS assertion int 2.00, con -0.22*. EQ int 7.00, con -1.13*. QSQ invited get-togethers int 0.89, con -0.13*. QSQ hosted get-togethers int 1.00, con 0.00* (*p<0.05)
Results (other)	None
% attrition rate	11% (2/19)
Limitations identified by author	Comprehensive standardized outcome measures not used. Assessment tools specifically designed for adults with ASD not used. Outcomes not measured by third party blind to allocation. Observed behavioural measures not used. Small sample size.
Limitations identified by reviewer	None
Study funding	NIH, Organization for Autism, Philip and Aida Siff Educational Foundation

Gentry (2015)

Research question or focus	To evaluate the use of an iPod touch for workers with ASD to improve work performance and reduce support needs
Country of study	USA (Virginia)
Sampling methods and eligible population	"Participants in the study were enlisted from Virginia Department of Aging and Rehabilitative Services (DARS) clients with an ASD diagnosis confirmed by school record or medical report who were scheduled to begin a job coach-supported paid work placement in the Commonwealth of Virginia." (p672) No further information.

Recruitment methods	Participants gave consent. No further information.
% participation rate	NR
Sample demographics at baseline	84% male; mean age 24.0; 86% living with parents; 68% regular high school diploma; 68% conversant (others 'selectively non-verbal'); 92% able to read
Sample size	N=50 (N=26 intervention, N=24 control)
Design	RCT
Intervention description	"The intervention included four components: 1. A detailed workplace assistive technology assessment conducted by an OT [occupational therapist] in collaboration with the participant, job coach and employer; 2. Identification of an individualized suite of iPod Touch-based applications and strategies appropriate to support the participant in the workplace; 3. Training of the participant by the OT in the use of an Apple iPod Touch and the selected apps on the job; and 4. Follow-along and fading of occupational therapy supports as the worker incorporated the device into her/his workday. … The study's principal investigator, an OT experienced in the use of PDAs as cognitive aids, performed the study intervention with all participants. … the OT collaborated with the worker participant, the participant's DARS job coach and the employer to identify support needs that might be met by a PDA. The OT then configured an Apple iPod Touch provided by DARS, and trained the participant how to use the device as a vocational support aid, providing additional training on the use and maintenance of the device, troubleshooting assistance and follow-along oversight as needed. Participants were encouraged to use the PDA as trained at work, job coaches were encouraged to incorporate PDA-based vocational support strategies in their ongoing employment support efforts, and employers were asked to allow use of the PDA as an assistive technology on the job. PDA-based applications and strategies employed in this way included: (1) task reminders, (2) task lists, (3) picture prompts, (4) video-based task-sequencing prompts, (4) behavioural self-management adaptations, (5) way-finding tools, (6) communication with the job coach via wi-fi, when available on the jobsite, and other supports. … The OT then trained the participant and job coach in using the device as a vocational aid, and provided follow-along support, as needed, during a trial of device utilization on the job. Participants were asked to use the device as trained at work, but were invited to take it home after work, keep it charged, and use it as they wished at home. Upon completion of the study, participants were allowed to keep their devices." (pp673-6)
Comparator description (if applicable)	Usual care (wait-list control)
Method of allocation (if applicable)	Random using automatic number generator
Baseline comparisons (if applicable)	Yes; no sig diff on age, gender, home setting, education, verbal level or reading ability

Data collection methods	Job coaching hours received (measured from agency records) Number of hours worked / month (measured from agency records) Supports Intensity Scale—Employment Subscale (SIS-EPS) (questionnaire measuring need for work-related supports - presume self-report) Employee Performance Evaluation Report (EPER) (general measure of work performance completed by job coaches) (NB assume here that data reported as "EPS" in outcomes is actually this outcome)
Analysis methods	Regression (generalised linear mixed-effect model)
Follow-up period	24 weeks (control group received intervention delayed by 12 weeks)
Results (effectiveness)	(NB post1=12 weeks, post2=24 weeks; control group received intervention after 12 weeks.) SIS int pre 35.0 post1 29.7 post2 25.0, con pre 39.5 post1 33.3 post2 28.5. EPS [sic - assume EPER] int pre 27.7 post1 32.8 post2 30.8, con pre 27.3 post1 31.6 post2 30.0. Hours worked int post1 250.1 post2 494.8, con post1 237.4 post2 476.3. Cumulative job coaching hours int post1 47.6 post2 66.5, con post1 79.4* post2 115.6* (*p<0.05 for between-group difference at single time point). Risk ratio for job coaching hours outcome 1.56(1.15-2.13) at 12 weeks, 1.67(1.18-2.38) at 24 weeks. Monthly hours at 4 weeks int 23.9 con 35.5*, 8 weeks int 10.8 con 18.0*, 12 weeks int 7.6 con 16.6*, 16 weeks int 8.4 con 14.7*, 20 weeks int 5.4 con 12.6*, 25 weeks int 5.2 con 11.2* (*p<0.05 for between-group difference at single time point).
Results (other)	Functional Assessment Tool for Cognitive Assistive Technology (FATCAT) (scores out of 5). Using a PDA has helped me improve performance in at least one area of my work 5.00. I received enough training to use the PDA effectively for my purposes 5.00. I find the PDA simple to use 4.83. I am able to use the PDA without any help from another person 4.50. I primarily use the PDA as a reminder system for things I need to do 4.00. I found that I was able to respond to reminder alarms almost every time one rang 4.32. I would like to continue using the PDA 5.00. Using the PDA is just a waste of time 1.00. I misplaced the PDA at least once 2.45. The PDA broke down at least once 1.45.
% attrition rate	9% (5/55)
Limitations identified by author	Participants met a certain standard of functioning and so are not representative of whole ASD population. Intervention led by practitioner with extensive experience and so results may not generalise to delivery by less experienced staff. Job coaches may have deliberately reduced hours in intervention group. Outcome measures reliant on reporting by job coaches.
Limitations identified by reviewer	Authors' interpretation of findings re job coaching hours (i.e. as indicating effectiveness of intervention in reducing hours) seems questionable: job coaching hours declined for both groups over first 12 weeks (i.e. when control was not receiving intervention) and did not reduce much further for the control group when they received the intervention (weeks 12-24). (This is exacerbated by the lack of a true pre-test for this outcome - since the intervention group received the intervention immediately after enrolment, the first monthly job coaching hours measure is at 4 weeks from baseline.)
Study funding	National Institute on Disability and Rehabilitation; Virginia Department of Aging and Rehabilitative Services

Hesselmark (2014)

Research question or focus	To compare a group CBT intervention and a group recreational programme for adults with ASD
Country of study	Sweden
Sampling methods and eligible population	Participants drawn from an outpatient tertiary psychiatric clinic specialising in assessment of ASDs and attention deficit hyperactivity disorder (ADHD) in difficult-to-treat psychiatric patients. Inclusion criteria: a clinical diagnosis of ASD, "age 18 years or above and having normal intellectual ability as indicated by mainstream schooling and absence of an intellectual disability diagnosis. All forms of psychiatric co-morbidity were accepted except current substance abuse, current psychosis, high suicide risk and being an inpatient. From the second year, suicidality and inpatient care were no longer exclusion criteria since the group setting was considered to be beneficial to these patients." (p674) Two additional patients added to recreational group in second year to compensate for attrition.
Recruitment methods	"Participants were recruited through referrals from psychiatric clinics and advertisements in patient organizations and publications." (p674)
% participation rate	N=6 of N=81 sampled did not meet inclusion criteria. None refused participation. N=7 of 73 (10%) allocated chose not to commence intervention after allocation
Sample demographics at baseline	Mean age 31.9 (CBT group), 31.8 (recreational group). ADOS score (autism symptoms) 11.4 C, 11.1 R. Male 49% C, 60% R. Employed or studying 22% C, 35% R. Living independently 82% C, 69% R. Co-existing psychiatric symptoms: 67% depression; 36% anxiety disorder; 45% ADHD/ADD; 18% OCD (lifetime); 15% borderline personality disorder; 38% other.
Sample size	N=73 at allocation, N=68 at baseline
Design	RCT
Intervention description	Group cognitive behavioural therapy led by psychiatrist and clinical psychologists (with supervision from qualified supervisors), supported by community support workers. Designed for adults with ASD and psychiatric co-morbidities, focusing on insight into dysfunction, acceptance and change. 36 weekly 3-h sessions. “Based on available literature, the CBT intervention consisted of five elements: (a) structure, (b) group setting, (c) psycho-education (e.g. lectures and discussions on ASD and psychiatric symptoms, including learning to identify and reappraise maladaptive thoughts), (d) social training (e.g. skill building such as practising phone calls and asking for help) and (e) cognitive behavioural techniques (e.g. setting goals, role-playing, exposure exercises and conducting behaviour analysis). Furthermore, the treatment was divided into three thematic modules: (a) self-esteem and ASD awareness, (b) social contacts and everyday life and (c) psychological and physical health. A manual describing the 36 individual sessions was created prior to starting the treatment …. Each session followed a strict agenda: (a) introduction and presentation of the agenda of the day, (b) review of homework assignments from the previous session, (c) psycho- educative lecture and discussions on the session topic, (d) coffee break with buns or sandwiches and social interaction, (e) relaxation or

	mindfulness exercise, (f) discussions and exercises on the session topic, (g) distribution of homework and (h) evaluation and end of session.” (p676)
Comparator description (if applicable)	Recreational intervention directed by psychiatric nurse assistant and a social worker, both with more than 20 years of experience, supported by an occupational therapist, special education teacher, social worker and psychiatric nurse assistant. "The purpose of the recreational activity intervention was to facilitate social interaction and to break social isolation. The therapists did not provide any deliberate techniques, such as psycho-education, social training or CBT. Instead, this intervention relied on structure and group setting only. During the first session, participants were asked to write down group activities they would like to engage in. The therapists created a list of the suggested activities, such as visiting museums, playing board games, cooking, restaurant visits, boating, cinema and taking walks. Each week, participants voted for the next session’s activity." (p676)
Method of allocation (if applicable)	Random. Randomisation conducted manually using paper-based lottery
Baseline comparisons (if applicable)	Yes, on: age, gender, marital status, occupational status, years of education, and various measures of psychiatric morbidity and medication use. No significant differences "except that current diagnoses of depression and anxiety disorders were more common in the CBT group" (p674)
Data collection methods	Quality of Life Inventory Sense of Coherence scale (Antonovsky) Rosenberg Self-Esteem Scale Symptom Checklist 90 Autism Quotient Beck Depression Inventory Adult ADHD Self-Report Scale Clinical Global Impression Scale–Severity (CGI-S) (Clinical Global Impression Scale–Improvement (CGI-I) measured at one time point only.) All outcome measures were self-completed questionnaires. Baseline measures collected after randomisation (not blinded). First post-test conducted at final intervention session. Authors note that many participants had difficulty in completing forms, resulting in missing data (per Table 2, some outcomes only available for N=47 participants (69%)). Long-term follow-up used shortened tool and was conducted either on paper, on internet or by telephone; participants received cinema tickets as an incentive (note only QOLI measured at both baseline and long-term follow-up).
Analysis methods	Study had power of 80% with effect size of d = 0.8. All analysis intention-to-treat, with missing data substituted with last observation carried forward. ANOVA and dependent t-test
Follow-up period	First post-test at end of 36-week intervention. Long-term follow-up (QoL outcome only) 8 to 57 weeks after end of intervention.
Results (effectiveness)	(C=CBT group, R=recreational activity group.) QOLI C pre -0.11 post1 0.64 post2 0.64, R pre –0.28 post1 -0.01 post2 0.30 (sig change at $p<0.01$ for pooled group over time, although unclear if this refers to post1 or post2). SoC C pre 95.94 post 101.39, R pre 100.48 post 96.26. RSES C pre 12.52 post 13.90, R pre 13.50 post 13.46. PCGI-S C pre 3.25 post 3.29, R pre 3.37 post 3.41. SCL-90

	(mean) C pre 1.45 post 1.41, R pre 1.42 post 1.36. AQ C pre 30.60 post 30.96, R pre 30.05 post 28.60. BDI C pre 15.13 post 15.48, R pre 18.85 post 20.00. ASRS C pre 38.67 post 39.63, R pre 36.85 post 35.85 (none sig for between-group comparison, none apart from QOLI sig for pooled pre-post change).
Results (other)	Follow-up questionnaire: Has anything in your life changed because of your participation in the group? (% 'yes') I have more social contacts than before C 28% R 28%. I have a better understanding of my own difficulties C 88% R 64%*. My self-acceptance has improved C 72% R 52%. My ability to express my needs is improved C 74% R 39%*. I feel happier C 52% R 46%. (*p<0.05 for between-group difference) Compared to before treatment, how do you feel today? (% improved) C 67% R 27% (p<0.05). Clinical Global Impression scale – Improvement. At post1: N=24 improvement, N=14 no change, N=1 deterioration (mean score 3.10), with sig diff between groups favouring CBT group. At post2 N=16 improvement, N=31 no change, N=1 deterioration (mean score 3.63), with no sig diff between groups.
% attrition rate	21/73 allocated (26%); 14/68 commenced intervention (21%)
Limitations identified by author	Focused on population with psychiatric comorbidities, so possibly limited generalisability to general HFA population. Participants consented to participate in group intervention so may have excluded those averse to social contact. All outcomes self-reported. Considerable amount of missing data for outcome measures.
Limitations identified by reviewer	Limited information on comparison arm (leisure intervention)
Study funding	L.J. Boëthius' Foundation, Swedish National Board of Health and Welfare, Swedish Research Council, Stockholm County Council, Karolinska Institutet

Hillier (2007a)

Research question or focus	To evaluate the effectiveness of the 'Aspirations' vocational and social skills programme for young people with ASD
Country of study	USA
Sampling methods and eligible population	NR. "Participants were recruited from a large city in the Midwest." (p108). Criteria for entry into the programme were ASD diagnosis, age 18-30 and motivation to attend, but NR if there were further criteria for the study.
Recruitment methods	"Group members were recruited via brochures describing the program that were sent to targeted referral sources [NR what these were]. Written consent was obtained from all participants" (p108)
% participation rate	NR
Sample demographics at baseline	85% male, mean age 19. Diagnosis 62% Asperger's, 31% PDD-NOS, 8% autism. Mean IQ 108.
Sample size	13
Design	One-group uncontrolled

Intervention description	"Aspirations was designed to be an 8-week program consisting of weekly 1-hour meetings. The goals, objectives, and curriculum were established over a 6-month period by a multidisciplinary team consisting of psychologists, social workers, rehabilitation service providers, speech pathologists, and a parent of an individual with ASD. The overall aims of the program were to foster understanding of a range of social and vocational issues, to enhance insight and awareness, and to provide social opportunities for group members. Each session was planned around a specific objective based on hypothesized weaknesses in insight or understanding. Topics and objectives were selected based on findings in the literature evidencing the need for support in particular areas, including successful employment; friendships and interpersonal problem-solving; and social communication and theory of mind. In addition, staff members drew on their own experience working with individuals on the autism spectrum, either as family members or in a clinical or vocational rehabilitation setting, to select useful topics. The sessions were designed to be directed by the group members, with the group facilitators guiding the discussion and ensuring that participants remained on topic. The format approximated a counselling support group model rather than a teacher-directed approach in which specific skills are explicitly taught. Group members learned and gained greater understanding by sharing personal experiences and listening to the experiences of others, by giving each other advice, and by creating problem-solving strategies as a group. At the beginning of each session, a group facilitator introduced the topic for the session and the areas to be covered. Each session ended with a review of what had been covered and a discussion by the group members of what they had learned in the session. To establish an atmosphere of belonging and acceptance, groups were restricted to between six and seven individuals and two group facilitators. Both group facilitators held graduate degrees and were experienced in managing social skills support groups. Meetings took place early in the evening (6:30–7:30 P.M.) and were held in a spacious room with participants seated in a semicircle. After completing the program, group members attended monthly reunions. Reunions facilitated transfer of skills learned in the group to real-life social situations and provided a relaxed and unstructured environment where group members could strengthen friendships. In addition, in recognition of the importance of parent involvement, parents were encouraged to attend a weekly self-directed parent support group. At the conclusion of the program, parents were encouraged to join a monthly parent group that also offered information and support." (p109)
Comparator description (if applicable)	N/A
Method of allocation (if applicable)	N/A
Baseline comparisons (if applicable)	N/A

Data collection methods	Self-report measures completed "during a 1-hour session in a quiet room at the university" Index of Peer Relations Autism Spectrum Quotient (AQ) Empathy Quotient "Structured observations were conducted to determine whether contributions made by group members changed in frequency over the course of the 8-week program. Two trained observers conducted observations of each session via a one-way mirror. Observers were trained by the authors through familiarization with and discussion of the observation categories, and by practicing coding example sentences that might be stated during a group session. Frequency of interactions between group members was recorded, as was type of interaction, defined as either relevant (e.g., on topic, appropriate to the current topic of discussion) or irrelevant (e.g., inappropriate to the topic of discussion, a diversion from current topic, or possibly a member's "special-interest" topic). … Two trained observers watched each of the group sessions and kept a tally of comments made by each group member. These were categorized into relevant comments and irrelevant comments. The tally of responses was assessed for interrater reliability between the two observers. Data collected by the two observers were compared for half of the sessions (Weeks 2, 4, 6, and 8) using the formula agreements, divided by agreements plus disagreements, multiplied by 100. The mean agreement across the 4 weeks was 94%. The numbers of comments made during the first half of the program (Weeks 1, 2, and 3) and the last half of the program (Weeks 6, 7, and 8) were examined to determine whether group members were participating more in the group over time"." (p110)
Analysis methods	Wilcoxon signed ranks test
Follow-up period	At end of 8-week programme
Results (effectiveness)	Index of Peer Relations pre 5.15 post 5.38. Autism Spectrum Quotient pre 2.42 post 2.40. Empathy Quotient pre 2.51 post 2.21* (*$p<0.05$). [Note full figures given for every question on each instrument, full data not extracted here.] For observational data, stated that significantly more contributions were made in the last weeks of the programme than the first, but full data NR.
Results (other)	"Feedback was gathered directly from participants during the last program session ... Members reported that they made friends with others in the group and maintained contact by telephone and e-mail. They also organized and initiated gatherings, such as attending one group member's high school play, watching the Super Bowl together, going bowling, and so on. The participants noted changes in their behaviour and an increased effort on their part to interact with other persons socially. They reported more positive attitudes toward gaining employment and a better understanding of the rewards of employment. About the program, participants said they benefited from the opportunity to meet and interact with other persons on the autism spectrum for the first time and to recognize that they are going through similar experiences and challenges. They also appreciated the opportunity to discuss difficult social and interpersonal issues in an environment where they felt comfortable. Feedback gathered from

	parents in a post-Aspirations meeting provided further evidence of behaviour changes that parents attributed to attending the program. Parents reported that their sons and daughters showed greater interest in social interaction, increased enthusiasm about attending Aspirations, and more pride in their appearance. They also reported that participants took more initiative in finding jobs." (p113)
% attrition rate	NR
Limitations identified by author	Not clearly reported
Limitations identified by reviewer	Small sample. Non-comparative design.
Study funding	NR

Hillier (2007b)

Research question or focus	To evaluate a vocational support programme for adults with ASC
Country of study	USA
Sampling methods and eligible population	Appears to be all who received service. "Nine individuals with ASD received services through the program in the 2-year evaluation period. Participants were recruited via an ASD clinic at our university and the transition services offices of local high schools." (pp36f) No further information
Recruitment methods	NR
% participation rate	NR
Sample demographics at baseline	88% male, mean age 22, IQ 111. "Two received substantial remedial support, taking most classes in a special education classroom, 5 attended some classes in mainstream classrooms, and 2 others were completely mainstreamed. None required residential schooling, and all lived at home with their parents (except for one person, who lived independently)." (p37)
Sample size	9
Design	One-group uncontrolled
Intervention description	Supported employment service. "Staffing levels for the program were modest, with a program coordinator employed part-time for 18 months and full-time for the last 6 months of the initial evaluation period. … Individuals were enrolled in the program at staggered intervals to allow the program coordinator to place a participant in a job successfully prior to beginning work with the next participant. … Preplacement services included instruction in job search skills and help in identifying appropriate job advertisements using Internet searches, company Web sites, and job ads in newspapers. This service helped participants interpret job ads, understand what jobs might involve, and figure out whether they were under- or overqualified for particular positions. Advice on and help with preparing résumés, favourably completing job application forms, and creating positive impressions in job interviews were also provided. Participants practiced completing

	job application forms and were counselled about what to include, what not to include, and how to describe previous work experiences as favourably as possible. Mock job interviews were videotaped so that participants could later review their performance with the program coordinator. These skills were taught one on one, and support continued until an appropriate job was found, which took from 1 month to 8 months. During this waiting period, participants continued to practice and improve their job search skills and actively search for employment. The program coordinator spent at least 1 hour per week providing preplacement support to each participant ,with the amount of time varying according to the participant's needs. Once a potential position was found, the program coordinator conducted a job site evaluation using a checklist that covered the work environment (e.g., noise level, crowding, type of equipment used), other employees at the job site, potential support systems (including previous experience in working with individuals with disabilities), and the tasks to be completed by the individual. The aim of the job site evaluation was to help ensure an appropriate job match. If necessary, the coordinator engaged in job development with the employer and negotiated changes to the tasks required for the position. Once the participant began his or her job, the program coordinator went to work with the participant and provided on-site job coaching support. The level of support needed varied from participant to participant but included help with training, acclimation to the job site, and social integration. The program coordinator ensured that each participant understood his or her job tasks and could complete them to the satisfaction of his or her supervisor, training the participant if necessary. She also ensured that the participant understood workplace rules, such as beginning and end times, break times, sick leave and vacation policies, and emergency procedures. The coordinator made sure that all participants knew their way around the buildings in which they were working, and how to get to and from work if they were commuting independently. Employers and coworkers were offered information regarding ASD and how, given participants' strengths and challenges, to interact optimally with each participant. If it became apparent that a participant was not developing social relationships with his or her coworkers, the program coordinator would provide him or her with advice and strategies to help enhance integration, including encouraging him or her to greet coworkers when arriving at work and to say good-bye when leaving. Whenever possible, one coworker was designated as a contact person to whom the participant could go with general questions about the workplace and the roles of other employees. The program coordinator also encouraged the participant to have conversations with his or her coworkers during break times and provided suitable topics to help initiate conversations, including recent movies, news events, and hobbies. … The amount of job coaching support provided per participant each week ranged from 4 hours to 20 hours, depending on the number of hours worked by participants and their needs…. During the first 2 weeks of employment, as part of this ongoing support, the coordinator visited the job site twice a week for a progress meeting with the

	participant and his or her supervisor. Typically, this was reduced to one meeting a week for the next 2 weeks and then to weekly communication by telephone or e-mail with the supervisor and the participant for another month. Subsequently, communication was reduced to once every 2 weeks, and at 6 months postplacement to once a month. Those parents closely involved in the program (n = 7) were also updated regularly on their children's progress in their job placements. If problems did arise, the program coordinator discussed these with the participant and his or her supervisor to find a solution. If necessary, the coordinator arranged a meeting with the participant to provide the necessary counselling or training or returned to the work site to offer additional hands-on training." (pp37-9)
Comparator description (if applicable)	N/A
Method of allocation (if applicable)	N/A
Baseline comparisons (if applicable)	N/A
Data collection methods	Employment status (presume from agency data) Hourly income (data source for this unclear - presume self-report) Assessment Worksheet (supervisor report) - participants' support needs and job performance Socialization Scale (supervisor report) - participants' social integration in the workplace Job Satisfaction Index (self-report) - participants' happiness with their jobs Program Satisfaction Measure (self-report) - satisfaction with programme (Employment status and hours worked are reported at post-test only.) Data were collected 3mo, 6mo and 12mo after job placement (i.e. at different points with respect to participation in the programme itself).
Analysis methods	Descriptive statistics
Follow-up period	12 months from baseline (data were collected up to 24mo but are not reported due to high attrition)
Results (effectiveness)	N employed 2 pre, 9 post (of 9). (All other results are for the N=6 who were retained at 12mo.) Mean hourly income $1.60 pre placement, $7.10 post placement. Assessment Worksheet. Has no absences 3mo 4.0 6mo 3.5 12mo 4.8. Is punctual 3mo 4.2 6mo 4.2 12mo 4.0. Completes assigned tasks 3mo 4.0 6mo 3.5 12mo 4.7. Returns to work if distracted 3mo 4.2 6mo 3.8 12mo 3.5. Transitions independently from one task to another 3mo 2.3 6mo 2.8 12mo 3.5. Begins work promptly 3mo 4.0 6mo 3.7 12mo 4.3. Observes rules of department 3mo 3.5 6mo 4.0 12mo 4.2. Works at an acceptable speed for given task 3mo 3.8 6mo 3.3 12mo 3.5. Dependable 3mo 4.2 6mo 4.0 12mo 4.5. Demonstrates expected knowledge of job 3mo 4.0 6mo 3.7 12mo 4.3. Examines work for errors before submitting it 30 2.3 6mo 3.0 12mo 3.7. Makes specified changes based on constructive criticism 3mo 3.3 6mo 4.2

	12mo 3.8. Follows verbal directions 3mo 4.0 6mo 4.2 12mo 3.5. Follows written directions 3mo 3.8 6mo 4.2 12mo 3.7. Asks for help when needed 3mo 2.5 6mo 3.5 12mo 4.2. Begins a task as soon as requested to do so 3mo 3.8 6mo 4.0 12mo 4.0. Asks for additional work or directions once a task is complete 3mo 3.5 6mo 3.5 12mo 4.0. Socialization scale. Shows interest in socializing with co-workers 3mo 5.8 6mo 5.8 12mo 7.8. Greets co-workers when appropriate 3mo 5.7 6mo 6.7 12mo 7.8. Says goodbye to co-workers when appropriate 3mo 4.0 6mo 6.0 12mo 8.5. Engages in 'chit chat' with co-workers 3mo 4.3 6mo 4.5 12mo 5.2. Joins in activities outside of workplace 3mo 0.0 6mo 0.5 12mo 1.8. N of friendships formed 3mo 1.8 6mo 3.5 12mo 4.0. Job satisfaction index. Satisfying 3mo 4.2 6mo 4.2 12mo 3.5. Interesting 3mo 3.8 6mo 3.2 12mo 3.3. Enjoyable 3mo 4.3 6mo 4.2 12mo 3.3. Useful 3mo 5.0 6mo 4.5 12mo 4.0. Challenging 3mo 3.2 6mo 3.0 12mo 2.5. Tiring 3mo 2.3 6mo 2.5 12mo 2.7. Frustrating 3mo 2.0 6mo 2.5 12mo 2.7. I am happy with my job 3mo 4.0 6mo 3.7 12mo 3.8. I wish I could leave my job 3mo 1.8 6mo 1.7 12mo 2.7. I am grateful for my job 3mo 4.5 6mo 4.5 12mo 4.5. Satisfaction with job 3mo 7.7 6mo 6.7 12mo 7.2. Satisfaction with supports received from programme staff 3mo 10.0 6mo 9.8 12mo 9.0. Satisfaction with programme overall 3mo 9.0 6mo 8.7 12mo 9.3.
Results (other)	None
% attrition rate	33% (3/9)
Limitations identified by author	Only self-report outcomes, not observed. Small sample size, so analysis could not take into account differences between individuals. No control group.
Limitations identified by reviewer	No significance testing of findings. Reliability of income variable unclear. For other measures, no true pre-test time point (first time point for questionnaire outcomes is 3mo from first job placement), so interpretation of findings in terms of effectiveness of programme is limited.
Study funding	Pfizer Inc., Ingram-White Castle Foundation, Gray Center for Social Learning and Understanding.

Hillier (2011)

Research question or focus	To evaluate the effectiveness of the Aspirations social and vocational skills programme for young people with ASC
Country of study	USA
Sampling methods and eligible population	Sampled via "clinicians serving the ASD population, and local, and regional organizations who serve those with ASD and other developmental disabilities", and participants in previous university-based programmes for ASD. Inclusion criteria for the programme were 18-30 years, clinically diagnosed ASD, and no severe behavioural challenges.
Recruitment methods	Brochures and flyers sent to clinicians and ASD organisations and to participants in previous programmes; adverts on university website. Participants paid $150 for the programme (scholarships were available for participants who couldn't afford this fee). Informed consent obtained.
% participation rate	NR

Sample demographics at baseline	86% male, mean age 21. 'Most' Caucasian, 2% African American, 2% Hispanic, 6% Asian. Diagnosis 86% Asperger's, 12% high-functioning autism, 2% PDD-NOS. Mean IQ 99.
Sample size	49
Design	One-group uncontrolled
Intervention description	Same intervention as Hillier 2007 q.v. - authors refer to that paper for fuller detail. "The Aspirations program consisted of eight one-hour weekly meetings with small groups of between five to seven participants. The curriculum had a discussion based format and was focused on improving social and vocational skills. Topics in the curriculum were planned around a specific objective based on the needs of those in the autism community which have been described in the literature …. The curriculum covered: Introductions (week 1), Social Communication (week 2), Relationships (week 3), Social event (going out for pizza; week 4), Independent Living (week 5), Independence and College (week 6), Employment (week 7), Conclusion and Review (week 8). The sessions were designed to be directed by the group members with the group facilitators simply guiding the discussion and ensuring participants remained on topic. Group facilitators were program staff (AH, TF and / or JS) and a graduate or undergraduate university student. Participants sat in a semi-circle to facilitate discussion. Group members learned and gained greater understanding by sharing personal experiences and listening to those of others, by giving each other advice, and by creating problem solving strategies as a group. Each session began with a group facilitator introducing the topic for that session and areas to be covered. Each session ended with a review of what had been covered and by asking the group members what they had learned that session" (pp270f)
Comparator description (if applicable)	N/A
Method of allocation (if applicable)	N/A
Baseline comparisons (if applicable)	N/A
Data collection methods	Self-report questionnaires filled out 2-3 weeks before programme started and at end. Beck Depression Inventory; State-Trait Anxiety Inventory; Index of Peer Relations. Some missing data (n=3 for STAI, n=5 for BDI, n=9 for IPR), partly due to non-response and (for IPR) because measure was only introduced after two groups had already started.
Analysis methods	Wilcoxon signed ranks test
Follow-up period	At end of 8-week programme (baseline was 2-3 weeks before start, so 10-11 weeks total)
Results (effectiveness)	Depression pre 14 post 11*. Anxiety pre 74 post 68*. Peer relations pre 127 post 132. (*$p<0.05$)
Results (other)	"Anecdotally, we received very positive feedback regarding the program from participants and their parents. Most of the participants said they enjoyed the program, that they had made friends, and had socialized with others from the program. This feedback was supported by parents." (p274)

% attrition rate	NR explicitly; highest N for outcomes is N=47, which would correspond to 4% attrition
Limitations identified by author	Negative IPR results may reflect increased self-awareness. Non-comparative design. Short follow-up. Only self-report measures.
Limitations identified by reviewer	None to add to authors'
Study funding	NINDS, Columbus Foundation, Gray Center for Social Learning and Understanding, Ingram-White Castle Foundation, Theodore Edson Parker Foundation.

Hillier (2012)

Research question or focus	To evaluate a music therapy intervention for young people with ASC
Country of study	USA
Sampling methods and eligible population	Sampling NR. Criteria for the intervention were: professional ASD diagnosis; age 13-30; and 'high-functioning' according to developmental profile instrument; able to participate in the sessions and no behavioural challenges.
Recruitment methods	NR
% participation rate	NR
Sample demographics at baseline	Mean age 18; 82% male; 95% Caucasian; diagnosis 73% Asperger's, 18% PDD-NOS, 9% HFA
Sample size	22
Design	One-group uncontrolled
Intervention description	"The music program called 'SoundScape' was an eight-week program consisting of 90-minute weekly music sessions. Participants were aged between 13 and 29 years but were frequently broken into smaller groups which were designed to have participants of similar ages. As an interdisciplinary program, sessions were run by music education students and students majoring in psychology at our university. … for each group there were nine program staff and around 11 participants…. During the eight sessions participants engaged in a range of hands-on music making activities including: listening to different types of music and considering the various techniques used in musical pieces, playing with and exploring sound with various musical instruments, and composing and improvising music. … The program curriculum required minimal musical ability and aimed to present many opportunities to experience success, acceptance from peers, and accomplishment. We intentionally moved away from a traditional music therapy model which often heavily emphasizes singing and/or musical instruments, and instead incorporated technology, computers, and music production software … The program sought to encourage musical self-expression, and required participants to analyze, problem-solve, create, and reflect on their work." (pp4-5)

Comparator description (if applicable)	N/A
Method of allocation (if applicable)	N/A
Baseline comparisons (if applicable)	N/A
Data collection methods	Index of Peer Relations Rosenberg Self-Esteem Scale State-Trait Anxiety Inventory "Self-report questionnaires were completed before and after the music program by the participants and a parent/guardian. These were completed during a 30 minute session in a quiet room at the university." p5
Analysis methods	Wilcoxon signed ranks test
Follow-up period	At end of 8-week programme
Results (effectiveness)	Index of Peer Relations (participant) pre 96.4 post 126.27*. Index of Peer Relations (parent) pre 87.88 post 95.82*. Rosenberg Self-Esteem Scale pre 28.36 post 30.22*. State-Trait Anxiety Inventory pre 46.83 post 40.78*. ($p<0.05$)
Results (other)	How enjoyable have you found the music program? 7.9 (out of 10). How interesting have you found the music program? 7.8 (out of 10). How much do you believe you have benefited socially from the music program? 7 (out of 10). Have you made any friends in the music program? 20 of 22 yes. (These questions also answered by parents but data NR; 16 of 18 parents said they benefited from the opportunity to interact with other parents.) (Also open questions (Appendix 1), data NR in this report.) [See also process results in Greher (2010), data extracted as qualitative study.]
% attrition rate	NR explicitly. Lowest N at post-test is 16, which would be 27%
Limitations identified by author	Only self- and parent-reported outcomes
Limitations identified by reviewer	Non-comparative design
Study funding	NR

Howlin (1999)

Research question or focus	To evaluate the effectiveness of social skills groups for adults with autism
Country of study	UK (London)
Sampling methods and eligible population	Sampled from people with an ASD diagnosis who had attended the Maudsley Hospital for diagnosis or treatment, who attended an initial 2-day course on social problems and skills and expressed interest in a social skills group
Recruitment methods	Unclear - all attended initial course but recruitment for that is NR

% participation rate	NR
Sample demographics at baseline	100% male, mean age 28.4, non-verbal IQ 109, expressive language age 16.94 years, comprehensive age 14.3 years (instruments NR).
Sample size	10
Design	One-group uncontrolled
Intervention description	"Meetings were held on a monthly basis, and lasted around 2 1/2 hours. In the first meeting the agenda for the year as a whole was agreed, taking major issues that were raised by the group members themselves. There was a specific agenda for each meeting, as detailed below, and the first part of the session was also used for each of the members to discuss any events of importance that had occurred in the previous month. The focus of the group was on taking a positive approach to problem solving, and in each of the sessions real life examples of difficulties encountered by the members were used as teaching examples. The teaching strategies employed included role-play, team activities and structured games, and incorporated feedback from video recordings made during the sessions …. The sessions also concentrated on certain core features of conversational ability. These included ways of initiating and maintaining conversations, appropriate ways of responding to what was said, and the need to avoid repetitive or stereotyped utterances. In more structured activities, such as job interview skills, attention focused on the need to reply directly and relevantly to questions, and to avoid inappropriate comments or verbalizations." (pp300-1). Topics covered included: identifying with others; expressing emotions; conversational skills and body language; communication with friends and strangers; assertiveness; problem-solving and stressful situations; job interviews.
Comparator description (if applicable)	N/A
Method of allocation (if applicable)	N/A
Baseline comparisons (if applicable)	N/A
Data collection methods	"Changes in conversational ability were monitored by means of video recordings of simulated social activities, made at the beginning and end of the year's programme. In one task the group member was asked to pretend that he was at the wedding party of a family member and required to introduce himself and 'chat' for 7 minutes to another 'guest' (a volunteer from the Psychology Department).The other task involved making a phone call to enquire about a job vacancy. During the 'party' scenario stooges were instructed to use only limited questioning and not to lead the subject but generally to respond to what he said in a socially appropriate way. For the 'job enquiry', questioning was deliberately structured by the stooge. The interviews were repeated, but with different stooges, after a year. The language categories assessed were chosen to reflect teaching strategies used

	over the year and inter-rater reliability for each ranged from 75 to 100 percent." (p302)
Analysis methods	Wilcoxon Z
Follow-up period	At end of 1-year programme
Results (effectiveness)	"Party" scenario. Total utterances N pre 59.00 post 54.22. % conversation maintaining / initiating pre 34.56 post 50.56*. % general statements pre 16.89 post 14.67. % appropriate responses pre 25.44 post 22.89. % inappropriate utterances and repetitions pre 17.56 post 9.56. % other pre 5.00 post 2.35. "Job enquiry" scenario. Total utterances N pre 14.22 post 15.11. % offering/requesting information pre 11.88 post 16.00. % appropriate responses pre 51.78 post 62.11*. % inappropriate utterances pre 24.11 post 12.00*. % social utterances pre 10.44 post 3.27. % other pre 1.56 post 0.67. (*p<0.05)
Results (other)	"At the end of the year a checklist of areas in which improvements might have occurred was sent to families and the group members themselves. … all the families who replied reported improvements in their sons' conversational and social skills, and in their appearance, self-confidence and general independence. All but one felt their son's decision-making ability had improved and all but two noted improvements in problem-solving skills and ability to make or keep friends. Amongst the group members, all but one reported improvements in their communication skills (including their understanding of others' body language); their ability to interpret other people's emotions; and their ability to relate to people at home and outside. All but two felt that they had been helped to improve their problem-solving and decision-making abilities. Only one person said that he had not enjoyed mixing with the other group members, and only one felt that the group had failed to help him understand more about the problems associated with autism or Asperger syndrome. Everyone considered that the group had helped by offering the opportunity to meet and listen to individuals with problems similar to their own." (pp301f)
% attrition rate	10% (1/10)
Limitations identified by author	Non-comparative design. Unclear if skill improvements were generalised.
Limitations identified by reviewer	Small sample. Outcome measures are difficult to interpret.
Study funding	NR

Kandalaft (2013)

Research question or focus	To evaluate a virtual reality social cognition training tool for young people with ASC
Country of study	USA (Texas)
Sampling methods and eligible population	Sampling NR. Inclusion criteria: professional diagnosis of Asperger's or PDD-NOS, confirmed by Autism Diagnostic Observation Schedule. Exclude: psychiatric or neurological conditions.
Recruitment methods	"recruited by the Center for BrainHealth at the University of Texas at Dallas"; no further information

% participation rate	NR
Sample demographics at baseline	75% male, mean age 21.25, mean years education 13.25, IQ 112, ADOS score 8.25
Sample size	8
Design	One-group uncontrolled
Intervention description	Virtual reality environment using protected area in Second Life. Avatars were modelled to resemble participants and coaches. Participants logged on to machines at the University centre and did 10 sessions over 5 weeks. "Social scenarios were constructed in order to emphasize the learning objective of the session in varying contexts, such as meeting new people, dealing with a roommate conflict, negotiating financial or social decisions, and interviewing for a job. … The VR-SCT intervention manual provided the procedure, standardized prompts, and questions for the two clinicians, the ''coach'' and the ''confederate,'' involved in each session. … The coach facilitated each session with the participants in real life and met with the participant prior to each session, facilitated setting him or her up at the computers, and moderated each session in the VR with an avatar resembling her physical characteristics. The confederate clinician changed avatars (e.g., older man to younger female) and morphed her voice to match the gender, age, and race of the avatar being portrayed in each scenario. For example, in Session 5 Job Interview, after logging into the VR system a participant would be greeted by the coach avatar in the VR and instructed to go to the office building for his/her first interview (see Fig. 2 of a screenshot of the job interview scenario). During the first interview with the interviewee (confederate therapist acting as an older male) the coach would observe the participant's performance and take notes on social objectives (e.g., recognizing emotion and interest of interviewer, responding appropriately with relevant language, conveying emotion and interest). After the interview ended and the participant exited the office building, the coach asked structured questions about the participant's insight into his/her performance during the interview and then provided education and individualized feedback. Next, the participant would be instructed to go to the electronic store for his/her second interview and to attempt to incorporate the feedback they just received." (p36-7)
Comparator description (if applicable)	N/A
Method of allocation (if applicable)	N/A
Baseline comparisons (if applicable)	N/A
Data collection methods	Social Skills Performance Assessment "to assess conversational abilities (such as clarity, fluency, social appropriateness, affect, and overall argument) of two structured prompts. Responses from the semi-structured, role-played conversations were audio recorded. Ratings were completed by two raters that were blinded

	to the pre- or post- time point. Scores were averaged, as ratings were within approximately one point of each other on each item and agreement was low." (Also various cognitive measures, not in scope of this review; follow-up survey at post-test only.)
Analysis methods	Descriptive statistics; change scores with 95% CIs
Follow-up period	At end of 5-week programme
Results (effectiveness)	SSPA change score +3.50
Results (other)	"The participants' verbal feedback indicated that they enjoyed the sessions and would have enjoyed additional sessions…. Participants reported specific social benefits as a direct consequence of their participation with the intervention. Most participants indicated that using the computer intervention and advanced technology assisted with drawing them out into social situations to boost their overall confidence. This added insight and confidence provided more willingness to experience social opportunities within everyday situations." (p41) Did the VR-SCT directly improve the follow skills or areas of functioning? Recognizing others [*sic*] emotions 71 % Expressing my emotion 57 % Understanding other's point of view 86 % Introducing myself 57 % Small talk 71 % Starting a conversation 71 % Maintaining a conversation 100 % Negotiation skills 57 % Confronting others 71 % Job interviewing skills 71 % Establishing relationships 86 % Academic Functioning 14 % Occupational Functioning 86 % Social Functioning 71 % Would you recommend this intervention to others? 100 %
% attrition rate	Apparently 0%
Limitations identified by author	SSPA outcome may not generalise to real-life social functioning.
Limitations identified by reviewer	Small sample. Non-comparative design. Study is focused on cognitive outcomes; only one data point on outcomes of interest for this review
Study funding	Lattner Family Foundation, Sparrow Foundation, Rees-Jones Foundation, Crystal Charity Ball, Lee and John Wacker

Koch (2015)

Research question or focus	To evaluate the feasibility of dance movement therapy for young people with ASC
Country of study	Germany
Sampling methods and eligible population	Inclusion criteria: ASD; ≥16 years; able to move and stand for 1 hour. Participants sampled from "the University Hospitals of Heidelberg, at the Central Institute of Mental Health in Mannheim, and at SALO + PARTNER GmbH in Ludwigshafen, a professional rehabilitation institution of secondary education" (presumably from service users).
Recruitment methods	"Participants were contacted either by posted flyers or by their physician or psychologist." p340
% participation rate	NR

Sample demographics at baseline	74% male, mean age 22; diagnosis 39% Asperger's, 32% autism not further specified, 19% early childhood autism, 10% atypical autism; severity of symptoms rated by therapist 19% severe, 48% moderate, 10% mild [*sic*]
Sample size	31
Design	Non-randomised controlled
Intervention description	Dance movement therapy, 7 sessions once/week 1 hour each. Led by movement therapist with psychology students as assistants; assistants were trained using manual. No participant received any other psychotherapy for the duration of the study. "Every session consisted of basically the same sequence of mirroring exercises and a verbal processing part. (a) Warm-Up (about 10 minutes)… (b) Dyadic movement part (about 15–20 minutes): Ideally, a dyad consisted of one therapist/assistant and one participant. Only in cases when there were fewer therapists/assistants than participants, two participants formed one of the dyads among each other. Each participant had the opportunity to choose his or her preferred partner. After choosing the partner, the therapist explained the task of the session to the participants. First, the participant was asked to lead … then upon the second song, the assistant was asked to lead and the participant followed, and then upon the third song, both were asked to move freely but to always stay in contact with each other, no matter whether they were at the opposite sides of the room. It was emphasized that it was not important during mirroring that each person exactly mirrored the shapes of the other person's movement, but that it was important that their movements reflected the quality of the other's movement, genuinely trying to be with them. For the dyadic mirroring, a mix of slower and faster short pieces of music was used (each at maximum 3 minutes). This free dancing part also ensured that participants had the opportunity to freely choose the mirroring modality they preferred. (c) Baum-circle (about 20 minutes): After the dyadic movement part, all participants came together again in a circle. … For this part of the session, participants were encouraged to bring their own music …. Then the first volunteer initiated movement to his/her self-selected piece of music, being asked to basically focus on the expression of his feelings and not to pay too much attention to the others, while all other participants were asked to follow in the same kinesthetically attuned way they did before in the dyads. …. (d) Verbal processing part (about 10–15 minutes): Finally, all participants sat down to reflect on the session moderated by the therapist. In this context, the participants could express their actual feelings and their opinion regarding the session." p341
Comparator description (if applicable)	No intervention
Method of allocation (if applicable)	Non-random, matched by age, sex and severity of autism symptoms.
Baseline comparisons (if applicable)	Stated that no significant baseline differences, although full data NR and unclear which variables were tested

Data collection methods	Heidelberger State Inventory (wellbeing) Questionnaire of Movement Therapy (body awareness, covers "trust in one's own ability to be aware of the own body, related affects, and the interaction of both" p342; also includes subscale on social skills e.g. "I am able to behave appropriately in interpersonal situations," "I am able to accept criticism directed to me," and "I am able to trust others") "Self–other awareness was assessed by a self-constructed scale comprising the items "I am aware of myself," "I feel able to engage with others," "I feel able to perceive the boundaries between me and other persons well"" p342 Emotional Empathy Scale
Analysis methods	ANOVA
Follow-up period	At end of 7-week programme
Results (effectiveness)	Body awareness int pre 4.08 post 4.35 con pre 3.84 post 3.67 *. Self-other awareness int pre 3.96 post 4.44 con pre 3.76 post 3.66*. Psychological well-being (HSI) int pre 4.07 post 4.45 con pre 3.76 post 3.77*. Emotional Empathy Scale int pre 3.12 post 3.23 con pre 2.96 post 2.86. Social skills int pre 4.32 post 4.39 con pre 3.98 post 3.77*. (*p<0.05 for group x time interaction)
Results (other)	13 of 16 participants reported that they would like to continue with the therapy. Mean perceived fun 4.56 (range 1-6).
% attrition rate	Stated 0%, but this may refer to treatment group only
Limitations identified by author	Not all outcomes validated. Small sample size. Non-random allocation. Possible Hawthorne effect (i.e. effect from increased attention to intervention group). Blinding of participants and those delivering intervention not possible. Self-report outcomes. Heterogeneous sample. Fidelity of implementation only measured at one session. Unclear whether mirroring specifically accounted for intervention impact.
Limitations identified by reviewer	None to add to authors'
Study funding	German Federal Ministry for Research and Education

Koegel (2013)

Research question or focus	To evaluate the effectiveness of structured social planning for college students with ASD.
Country of study	USA
Sampling methods and eligible population	"Three adults diagnosed with ASD (Asperger's syndrome) by an outside agency participated in this study. ... Participants were selected from a pool of 12 students receiving services because they were the most severe in regard to a low level of social activity." p900
Recruitment methods	NR
% participation rate	Unclear
Sample demographics at baseline	All male, mean age 22.3 y, 2/3 Caucasian 1/3 Hispanic, all university students, all Asperger's diagnosis
Sample size	3

Design	One-group uncontrolled
Intervention description	"Sessions were conducted for 1 hour per week and consisted of: (1) assessment of social activities based on each student's interest; (2) researching community/university events to find an appropriate ongoing club or activity based on the student's interest; (3) organizational skills so that each student could use time-management strategies to remember to attend the event and work other student responsibilities around the social event; (4) designation of a neurotypically developing peer mentor (when necessary) to attend the social event; (5) engagement in weekly meetings to discuss the social event and ways to interact with others at social events; and (6) systematic fading of support. Intervention procedures included step-by-step social planning, support, and instruction in organizational skills ... A graduate student clinician or post-doctoral clinician first met with the participants to discuss their interests, likes, dislikes, and other preferences. .... In the second session, the menu of social opportunities for the upcoming week was presented to the participant. The options consisted of school-affiliated clubs, one-time social events on campus or in town, community organizations, leisure classes, events in the dormitories, and dining with peers. The participant was asked to select a minimum of one activity that he would attend during the week. … Each weekly session, participants were trained how to manage the social activities that they selected. The purpose of the organizational skills was to ensure that participants would attend the club. … the clinician would assist them in documenting the time, place, and activity for the week. If the participant also used an online calendar or phone organizer, he was trained how to input the same details for the activity in the additional format. Next, all contact information and directions for the event were located. Contact information was put into the participant's cell phone, and a copy of the directions was provided for him to keep. … Participants were given the option to have a similar-age neurotypically developing peer attend the activity with them for additional support. The peers were undergraduate research assistants receiving practicum course units at the university. … During weekly meetings, each participant discussed the social event. Areas discussed included how to meet people by introducing oneself, how to get contact information (phone numbers) from peers, how to invite peers to attend events, topics of conversation to bring up or discuss, how to ask questions of peers about their interests, appropriate ways to say "goodbye" when a club finishes, and so forth. … Structured social planning was gradually faded. In addition, after the intervention ended, the participants were encouraged to continue to engage in social activities without a peer mentor." (pp901-3)
Comparator description (if applicable)	N/A
Method of allocation (if applicable)	N/A

Baseline comparisons (if applicable)	N/A
Data collection methods	N of social activities ("collected each week through a systematic activity log and verified through the peer mentor and occasional spot checks by the clinician or undergraduate students (e.g., walking past the club).") Academic performance (grade point average) Satisfaction with socialisation (questionnaire)
Analysis methods	Descriptive
Follow-up period	33 weeks
Results (effectiveness)	N of social activities per week: participant 1: pre 0, during intervention 0-8, follow-up 8-10; p2: pre 0, during intervention 1-9, follow-up 3-9; p2: pre 0, during intervention 0-15, follow-up 7-18. GPA: p1: pre 2.37 post 2.83; p2: pre 3.3 post 4.0; p3: pre 2.42 post 2.51. Satisfaction in Socialization. Satisfaction with college experience pre 1.7 post 6. Satisfaction with peer interactions pre 1.7 post 5.3. Confidence in peer conversations pre 1.7 post 5.7. Satisfaction with number of friends pre 3 post 5.7.
Results (other)	None
% attrition rate	Apparently 0
Limitations identified by author	NR
Limitations identified by reviewer	Small sample. Non-comparative design.
Study funding	NIH, Kelly Family Foundation, Broad Center for Asperger's Research

Laugeson (2015)

Research question or focus	To evaluate the effectiveness of the PEERS social skills programme for young people with ASC
Country of study	USA (California)
Sampling methods and eligible population	Participants were sampled from (service users known to) The Help Group (community mental health agency for people with ASC) and the UCLA PEERS Clinic. Inclusion criteria: age 18-24; previous professional diagnosis of ASD; caregiver-reported social problems; motivated to participate; fluent in English; had a caregiver fluent in English and willing to participate; IQ>70 Kaufman; AQ≥26; no major mental illness or visual or hearing impairment that would preclude participation in group activities.
Recruitment methods	Unclear. "Eligibility appointments and baseline assessments were conducted at the UCLA PEERS Clinic by trained members of the research team, including graduate students and postdoctoral fellows specializing in psychology."
% participation rate	NR
Sample demographics at baseline	Mean age int 21.0 con 19.7, male 77% int 75% con, Caucasian 44% int 62% con
Sample size	22 (12 int, 10 con)

Design	RCT
Intervention description	"The PEERS for Young Adults Intervention consisted of 16 weekly 90-min sessions delivered in the community at The Help Group. Young adults and their caregivers attended separate concurrent sessions led by a licensed clinical psychologist and a post-doctoral psychology fellow, respectively. Behavioural coaches, comprised of graduate and undergraduate students in psychology and education, monitored treatment fidelity throughout the sessions, conducted role-play demonstrations of targeted skills, and provided social coaching with performance feedback during young adult behavioural rehearsal exercises. All members of the treatment team, including behavioural coaches, were trained and supervised throughout the intervention by a licensed clinical psychologist, who was also the young adult group leader and developer of the intervention. Weekly 90-min didactic lessons were provided to deliver instruction and rehearsal of social skills related to developing and maintaining friendships and romantic relationships, and to manage peer conflict and rejection. Didactic lessons included content related to conversational skills; electronic forms of communication; developing friendship networks and finding sources of friends; appropriate use of humour; peer entry and exiting strategies; organizing and having successful get-togethers with friends; handling teasing and chronic bullying in the school or work place; managing peer pressure; conflict resolution; and strategies related to dating etiquette including showing romantic interest, asking someone on a date, handling rejection, and general dating guidelines. … Within the young adult group, social rules and steps were presented using a Socratic method of questioning, intending to promote and enhance participation in the lesson. Role-play demonstrations of targeted behaviours were also used to model appropriate and inappropriate examples of the rules and steps. In order to enhance social cognition, role-play demonstrations were followed by perspective taking questions in which participants were asked to take on the perspective of the receiver of the appropriate or inappropriate social behaviour. Questions such as, ''What was that like for the other person?'' and ''What did they think of me?'' and ''Will they want to talk to me again?'' were asked of the participants after each role-play demonstration. Structured practice followed each lesson through a behavioural rehearsal exercise in which young adult participants practiced the appropriate newly learned skills while receiving performance feedback through social coaching by the treatment team. Socialization homework assignments were given for each of the targeted social skills to aide generalisation of skills outside of the treatment setting. …. In order to ensure 100 % fidelity to the PEERS for Young Adults Treatment Manual (Laugeson and Frankel in press), trained behavioural coaches monitored treatment fidelity in every session and notified group leaders immediately if any aspect of the treatment was missed during the lesson and before concluding the session." (p3983) Caregiver sessions focused on providing assistance and social coaching.
Comparator description (if applicable)	Wait-list (no intervention)

Method of allocation (if applicable)	Random by coin flip
Baseline comparisons (if applicable)	Yes: age, gender, ethnicity, autism symptoms, baseline measures; no sig diffs
Data collection methods	Social Responsiveness Scale (caregiver report) Social Skills Rating System (caregiver report) Quality of Socialization Questionnaire (self- and caregiver report) Empathy Quotient (caregiver report) (also Test of Young Adult Social Skills Knowledge, not in scope of this review)
Analysis methods	MANOVA
Follow-up period	32 weeks from baseline (at end of 16-week programme, then final follow-up after a further 16 weeks)
Results (effectiveness)	Results expressed as change scores (comparing int vs con at 16 week follow-up). Self-reported measures. QSQ total get togethers int 3.56, con 1.13*. QSQ hosted get-togethers int 1.55 con 0.13. QSQ invited get-togethers int 2.00 con 1.00. Caregiver measures. SRS total int -9.22 con 0.13*. SRS social motivation int -7.00 con 1.38*. SRS autistic mannerisms int -11.67 con 2.25*. SRS social communication int -9.00 con -2.00. SRS social awareness int -6.33 con -2.38. SRS social cognition -6.56 con 0.38. SSRS social skills score int 12.00 con 11.64*. SSRS cooperation int 2.22 con -0.13*. SSRS assertion int 4.22 con 0.38*. SSRS responsibility int 1.78 con 0.00. SSRS self-control int 1.78 con 0.38. QSQ total get-togethers int 3.78 con 0.38*. QSQ hosted get-togethers int 2.00 con 0.00*. QSQ invited get-togethers int 1.78 con 0.38. EQ total score int 2.67 con 1.50. (*p<0.05 for diff in change scores int vs con) Absolute scores for treatment group. Self-report measures. QSQ total get-togethers pre 1.11 post1 4.67* post2 5.25*. QSQ hosted get-togethers pre 0.56 post1 2.11 post2 1.75. QSQ invited get-togethers pre 0.56 post1 2.56* post2 3.50*. Caregiver measures. SRS total score pre 72.11 post1 62.89* post2 61.50*. SRS social motivation pre 67.44 post1 60.44* post2 56.75*. SRS autistic mannerisms pre 72.56 post1 60.89* post2 60.88*. SRS social communication pre 69.33 post1 62.78* 60.75*. SRS social cognition pre 71.44 post1 62.44* post2 62.25*. QSQ total get-togethers pre 1.00 post1 4.77* post2 4.67*. QSQ hosted get-togethers pre 0.44 post1 2.44* post2 1.50. QSQ invited get-togethers pre 0.56 post1 2.33* post2 3.17*. EQ total score pre 18.22 post1 20.89 post2 25.50*. SSRS social skills score 78.89 post1 90.89* post2 90.88*. SSRS cooperation pre 9.22 post1 11.44* post2 10.13. SSRS assertion pre 5.56 post1 9.78* post2 10.13*. SSRS responsibility pre 13.00 post1 14.78 post2 15.13*. (p<0.05 for single-group change from baseline) Results also reported for control group after they received treatment, not extracted here.
Results (other)	None
% attrition rate	14% (3/22) at first post test; 23% (5/22) at final follow-up
Limitations identified by author	Standardised diagnostic instruments not measured. No blinded behavioural outcomes, only self-/caregiver reports. Small sample size. No active-treatment control group.

Limitations identified by reviewer	Sampling and recruitment unclear
Study funding	NIH, Organization for Autism

Mawhood (1999)

Research question or focus	To evaluate the effectiveness of a supported employment scheme for adults with Asperger's or HFA
Country of study	UK
Sampling methods and eligible population	Inclusion criteria: formal diagnosis of autism/Asperger's; IQ≥70 either verbal or performance WAIS; actively seeking work; able to travel independently; capable of maintaining employment; no additional psychiatric or physical problems that would adversely affect employability. Sampling process NR as such.
Recruitment methods	Intervention group via clinical contacts (N=16), by parents or relatives (N=5), by employment service advisers (N=5), self-referred (N=3) and through parent support groups (N=1). Control group through parent support groups and adverts in an Asperger's newsletter.
% participation rate	NR
Sample demographics at baseline	Intervention group N=27 male, N=3 female; control group all male. Mean age 31 int, 28 con. IQ 99 int, 98 con. Diagnosis intervention group 77% Asperger's, 17% autism, 7% autistic spectrum disorder; control 90% Asperger's, 5% autism, 5% ASD. Education: university degree or higher 20% int, 25% con; A-levels 17% int, 10% con; GCSE or equiv 60% int, 55% con.
Sample size	50 (30 int, 20 con)
Design	Non-randomised controlled
Intervention description	Programme staff identified suitable jobs through links with employers (N=13, most found through Employers' Forum on Disability) or on the open market. Programme staff "ensur[ed] that clients could cope with the social and occupational requirements of the job … educating and informing potential and existing employers, and advising colleagues and supervisors on how to deal twith or avoid problems. … The amount of support decreased to weekly or twice weekly visits during the second month and was then further reduced so that by the end of the fourth month only occasional, but planned, meetings between employee, line manager and support worker were required. However, a support worker could always be contacted at any time in an emergency" (p233). Individuals were registered for on average 17 months, but this varied considerably (5-24 months).
Comparator description (if applicable)	No intervention
Method of allocation (if applicable)	Control group were located from people meeting inclusion criteria but living outside Greater London. Matching NR
Baseline comparisons (if applicable)	Age, IQ, language; no sig diffs

Data collection methods	N in work, time spent in work, wages (questionnaire) Rosenberg Self-Esteem Inventory
Analysis methods	Chi-square, Mann-Whitney, Wilcoxon
Follow-up period	2 years from baseline
Results (effectiveness)	N in work: int pre 8, post 19; con pre 3, post 5 ($p<0.05$ for int pre-post within-group change and int vs con difference at post test). Same pattern of significance for subgroup who were available for work through the whole study period and for whom pre-scheme information was complete (full data NR). Percent time in work (based on proportion of time registered for work) int pre 18.58% post 26.81% con pre 10.79% post 7.61% (both ns within-group; for N=26 int and N=17 con who were available for work in the 6mo prior to study period); for total group across scheme period int 27.09% con 12.35% ($p<0.05$). Mean hourly wage £5.71 int £4.14 con ($p<0.05$). Rosenberg Self-Esteem Inventory int pre 21.79 post 22.08 con pre 21.50 post 22.25 (ns).
Results (other)	Made friends as a result of new job 2 of 18 yes. Senior managers 7/8 very satisfied. Line managers 14/15 found support workers very helpful. Participant satisfaction: of those who found job (N=18): N=11 'very helpful' N=6 'quite helpful' N=1 'not very helpful'; of those who did not find job (N=7): N=2 'very helpful' N=4 'quite helpful' N=1 'not very helpful'. Enjoy job 13/17 yes. All but 2 satisfied with pay and hours worked. All participants "felt they were generally respected and treated well at work" and "got on well with their support workers" (p244).
% attrition rate	Unclear. Several clients were no longer registered at the end of the study period, but data are presented across the study period so with respect to the analysis they are not dropouts.
Limitations identified by author	NR
Limitations identified by reviewer	Non-random allocation. Unclarity around data collection.
Study funding	Nuffield Foundation, Department for Employment, National Autistic Society

Morgan (2014)

Research question or focus	To evaluate the effectiveness of an interview skills intervention for adults with ASC
Country of study	USA (Florida)
Sampling methods and eligible population	"[P]articipants were recruited primarily from the Florida State University Center for Autism and Related Disabilities (CARD). All CARD clients in Tallahassee and surrounding communities that were in the age range for this study were mailed a letter describing the project along with a form where they could indicate interest in study participation. In addition, staff of local organizations serving adults with ASD was provided with recruitment information that they could share with their clients with ASD. Individuals were eligible to participate if they: (1) had previously been given a clinical diagnosis of ASD (including Autistic Disorder, Asperger's Syndrome, Pervasive Developmental Disorder- Not Otherwise

	Specified) meeting DSM-IV-TR (APA 2000) diagnostic criteria for an ASD, (2) ranged in age from 18 to 36 years, (3) demonstrated an verbal IQ above 70, and (4) possessed a special or regular high school diploma or a high school GED or equivalent." p2292
Recruitment methods	By letter, and through staff of local ASD organisations
% participation rate	NR; 4/33 initially recruited did not meet eligibility criteria and a further 1 declined participation before baseline.
Sample demographics at baseline	Male 92% int, 100% control. Mean age 25 int, 24 con. IQ 103 int, 103 con. At least some college education 85% int, 67% con. Int 100% White; con 73% White, 13% Hispanic, 7% Black, 7% other. Employed 23% int, 13% con.
Sample size	28 (13 int, 15 con)
Design	RCT
Intervention description	"ISC is a manualized 12-week, low-intensity group-delivered intervention aimed at increasing social–pragmatic skills with an emphasis on those essential to a successful job interview … (90 min per session). Meeting topics are organized to reflect portions of the interview process in a logical, structured format. Primary curriculum topics include: (1) Character, attitude, and persona, (2) Small talk, non-verbal communication, and hygiene, and (3) Interview questions, closing the interview, and follow-up. Each curriculum topic lasted approximately four sessions. Due to the social communication challenges faced by individuals with ASD, additional topics infused into the curriculum include: non-verbal communication; emotional regulatory strategies, and self-advocacy. Meeting content is presented in a variety of formats including discussion, role-play, video feedback, peer review, and games. Mock job interviews were conducted twice (pre and post-treatment) in order for each participant to practice interviewing skills and to serve as a context in which the skills taught in the ISC could be measured. The ISC treatment sessions were delivered by … an educator and former job coach with extensive experience working with adolescents and adults with ASD. … Delivery of treatment fidelity … was monitored monthly by the first author to document whether the instructor implemented ISC with the group as intended." p2295
Comparator description (if applicable)	Wait list; no intervention
Method of allocation (if applicable)	Random, matched by IQ (randomisation method NR)
Baseline comparisons (if applicable)	Yes: age, gender, IQ, adaptive behaviour, autism symptoms, education, ethnicity, employment status (sig tests NR, but appear similar on all these)
Data collection methods	Mock interview. "Five volunteer professionals unknown to the research participants conducted video-recorded mock interviews with scripted questions tailored to match participant career interests. Interviews were video-recorded for the purposes of conducting video review with project participants and for coding and data analysis. Interviewers were counterbalanced so that participants had a different interviewer each time. Interviews were be tailored for either entry-level or professional positions and

	consisted of a standardized set of questions presented in a flexible, naturalistic format. A trained undergraduate coder blind to group assignment and interview timing scored mock interviews. Interviews were scored using the Social Pragmatic Scale (Morgan 2011), an 8-item observational tool developed for the purposes of this project. Each item was scored using a 4-point Likert scale and included items related to greetings, appearance, social interaction, and communication. Inter-observer reliability was evaluated by two coders, who independently reviewed 20% of the video-recorded mock interviews." p2296 Vineland Adaptive Behavior Scale, social subscale only (parent rated) Patient Health Questionnaire - Depression Staff involved in assessing outcome measures were blind to allocation.
Analysis methods	Linear regression on residual pre-post gain scores. Intent-to-treat.
Follow-up period	6 months from baseline; shortly after completion of 3-month programme
Results (effectiveness)	Mock interview scores int pre 18.75 post 20.75 con pre 18.79 post 18.83 (sig time x group). Vineland Social Composite int pre 78.46 post 81.67 con pre 79.17 post 79.42 (ns). PHQ Depression int pre 7.69 post 5.42 con pre 7.86 post 7.92 (ns).
Results (other)	None
% attrition rate	14% (4/28)
Limitations identified by author	Small sample size so limited power. Short follow-up (with respect to end of programme). No information on other treatments or services received by participants. Social behaviour, relationships, employment status not measured.
Limitations identified by reviewer	None to add to authors'
Study funding	Autism Speaks

Ness (2013)

Research question or focus	To evaluate the effectiveness and acceptability of a peer mentoring programme for college students with Asperger syndrome
Country of study	USA
Sampling methods and eligible population	Source population was students at a public university. Inclusion criteria: "(a) Diagnosed with ASD; (b) current enrolment in courses at the host university; (c) IQ within normal limits; (d) failing or at risk for academic failure as defined by cumulative GPA at or near 2.0." Appears that all students at given site registering for student disability services who met criteria were considered for participation.
Recruitment methods	By disability services for students (DSS) administrator
% participation rate	Apparently 100%
Sample demographics at baseline	mean age 22; 2 male, 1 female
Sample size	3

Design	One-group uncontrolled
Intervention description	"The intervention package, dubbed SCL, was a strategy instruction paradigm that involved matching participants with a peer mentor. SCL was patterned after SREP and adopted three key features: SRL assessment, collaborative goal setting, and strategy instruction. … Mentors were two graduate students and an undergraduate student enrolled in communication sciences and disorders (CSD). CSD students were selected because of their coursework concentration ASD and Asperger syndrome, experience with on-campus clinical practicum, and training in professional/clinical ethics. In addition to classroom training, the mentors received specialized training in both ASDs and SRL prior to working with participating students. … To facilitate mentor training and implementation fidelity, workshop handouts, research articles, and intervention procedures were presented to mentors in a manual. … Each mentoring session was supervised by the researcher to promote uniform implementation across participants. Students met with mentors once a week for one-hour sessions at a clinical services facility on campus." (pp361f) Sessions focused on analysing participants' problems with academic work, goal setting, developing strategies and self-monitoring.
Comparator description (if applicable)	N/A
Method of allocation (if applicable)	N/A
Baseline comparisons (if applicable)	N/A
Data collection methods	Course grades - from student transcripts
Analysis methods	Descriptive
Follow-up period	1 semester, NR exactly
Results (effectiveness)	Grade point average pre 1.94 post 2.00
Results (other)	[extracted as qualitative data]
% attrition rate	Apparently 0
Limitations identified by author	NR; described as 'exploratory'
Limitations identified by reviewer	Very small sample. Non-comparative design. Only quantitative outcome is academic grades. Main focus of the study is process rather than outcome evaluation.
Study funding	NR

Palmen (2011)

Research question or focus	To evaluate the effectiveness of a leisure intervention for young people with high-functioning ASC
Country of study	Netherlands

Sampling methods and eligible population	Inclusion criteria: a) 16-35 yrs old, b) ASD diagnosis by licensed psychiatrist DSM-IV criteria, c) full-scale IQ≥85, d) experience difficulty with leisure and motivation to change leisure lifestyle, e) experience in group engagements. No further information on sampling as such
Recruitment methods	Recruited from local area via websites and newsletters for relatives of ASD individuals.
% participation rate	NR
Sample demographics at baseline	Mean age 21, 17% female
Sample size	12 (7 intervention, 5 control)
Design	Non-randomised controlled
Intervention description	"The 6-month leisure programme consisted of 15 group sessions. Two staff members of the treatment facility participated as programme leaders and they led the sessions under supervision of the first author. Sessions were held in the afternoon or in the evening on Fridays or Saturdays and lasted ~2.5 hours. Sessions were faded out from once a week (i.e. the first four sessions) to once in 6 weeks (i.e. the last two sessions. … Procedural strategies included the use of client-supported and self-management strategies, visual cues, common stimuli (e.g. programme setting, use of real life exemplars), behavioural practice and homework. Next to this, cognitive-behavioural techniques were used consisting of analyses of leisure lifestyle, positive feedback and least to most prompting in providing corrective feedback. During sessions, the programme leader stimulated participants to share their real life experiences and to give each other feedback and support. In general, each sessions consisted of seven components: (1) a warming-up in which participants could discuss leisure events that had occurred in the previous episode, (2) an evaluation of participant's home-work whereby feedback was given by the other participants and/or programme leader and problems in home-work were discussed, (3) an introduction of the session's topic, in which the importance of the topic was discussed and, in the case of leisure skills, the components of the skills were analysed, discussed and visualised, (4) a short break, (5) behavioural practice and feedback, in which skills were practiced using role-play exercises (e.g. a role-play in inviting somebody and making an appointment to go to the movies, in calling a club and asking for information) or real life exercises (e.g. making a leisure plan for the next weekend, arranging a leisure activity with a mate), (6) an instruction in homework for the next episode, in which an appointment was made with each participant by the programme leader for delivering support by mail or telephone and, finally, (7) a brief evaluation of the content of the session. … The leisure programme had five components: (a) introduction, (b) assessment, (c) leisure engagement, (d) leisure management and (e) generalisation. … participants' leisure lifestyle was analysed regarding leisure engagement … or leisure management … participants' personal goals were determined and the programme content was determined by selecting topics of leisure engagement and/or leisure management that were raised by the participants

	themselves. … information was given regarding the importance of participation and variation in leisure activities … strategies for leisure planning, making leisure choices and arranging leisure activities were introduced and analysed and the strategies were exercised using a variety of leisure activities." (pp300f)
Comparator description (if applicable)	No intervention
Method of allocation (if applicable)	Non-random, based on order of applications
Baseline comparisons (if applicable)	Age, gender, school/employment, living arrangements, not tested for significance
Data collection methods	Questionnaires measuring (1) need for leisure support, (2) engagement in leisure activities, (3) satisfaction in leisure lifestyle. Questionnaire content initially based on literature relating to leisure and people with developmental disabilities; potential items then ranked by professionals to arrive at final instrument. Self-report (and separate data on same instrument collected from 'a related person of each participant' in intervention group only).
Analysis methods	T-test
Follow-up period	1-2 weeks after completion of intervention (6 months from baseline)
Results (effectiveness)	Need for leisure support total score int pre 3.07 post 2.18, con pre 2.58 post 2.43 ($p<0.05$ for pre-post within int group, ns for pre-post within con group, ns for group x time). (Full breakdown of domains also reported, not extracted here.) Engagement in leisure activities int pre 1.82 post 2.13, con pre 1.63 post 1.83 ($p<0.05$ for pre-post within int group, $p<0.05$ for pre-post within con group, ns for group x time). (Full breakdown of domains also reported, not extracted here.) Satisfaction with leisure lifestyle int pre 45.71 post 64.29, con pre 51.40 post 57.20 ($p<0.05$ for pre-post within int group, ns for pre-post within con group, ns for group x time). Relative reports (N=5 in int group only). 16 items measured, reductions in 7, increases in 6, no change in 3; no pre-post changes significant.
Results (other)	"Participants rated the leisure programme as effective (*M*=3) in improving their leisure lifestyle. All participants reported that they still needed support in managing their leisure and in initiating unknown leisure activities. Participants rated the content of the programme as acceptable (*M*=3). The programme components concerning leisure lifestyle analysis, participation in unknown leisure activities and arranging leisure activities were rated as most instructive (*M*=3.3). Behavioural practice and homework were rated as the most efficacious parts of the programme package (*M*=3.4). Four participants reported that the programme should include less 'talking' and more behavioural practice in engagement in activities and managing leisure. They also reported that more leisure activities should be employed with their programme group. Coaching by mail (*M*=3) was rated as more useful th[a]n coaching by telephone (*M*=1.8). … The organization of the programme was rated as very good (*M*=3.8)." (p306)
% attrition rate	0

Limitations identified by author	Participants were motivated to participate in programme and so may have overestimated gains (and because of social desirability bias). Only perceptual, not behavioural measures. Small sample size. Non-random allocation. Control group not matched. Self-report data. Short follow-up.
Limitations identified by reviewer	Lack of validation or piloting of instruments (this study is the pilot)
Study funding	Local Government of the province of Gelderland, the Netherlands.

Pugliese (2013)

Research question or focus	To assess the feasibility and collect preliminary data on the efficacy of a problem-solving therapy intervention for college students with ASC
Country of study	NR (presume USA)
Sampling methods and eligible population	Inclusion criteria: ASD diagnosis based on ADOS (evaluated by research team). Exclusion: severe psychopathology. No further information.
Recruitment methods	"Recruitment of participants occurred through the university disabilities office." p720. No further information
% participation rate	NR
Sample demographics at baseline	Mean age 21, all male, all white, mean full-scale IQ 128
Sample size	5
Design	One-group uncontrolled
Intervention description	"Group therapy sessions were led by two advanced clinical psychology doctoral students. Therapy sessions were video recorded for coding of treatment integrity and adherence. … Adaptations to PST for ASD included the use of psychoeducation about ASD as it relates to the problem solving process (e.g., identifying problems with social context, difficulty generating possible solutions), immediate, direct, and specific feedback on performance, more intensive and lengthy modelling of new skills by the group leaders, direct instruction of skills, structured delivery of the program (e.g., timers, use of a whiteboard, reminders of upcoming meetings, scheduling meetings at the disabilities office to keep participants in a routine of going to meetings), the use of shaping to teach skills, and multi-modal practice. … [The programme also used] multiple teaching modalities, incorporating role plays, building on past successes, including visual aids, and increasing structure and predictability during therapy sessions … During the beginning of PSS:101, students selected a problem they wished to work on for the remainder of the program. The purpose of the first session, 'orientation to PSS:101/psychoeducation about ASD', was to provide an overview of, and rationale for, PSS:101 and to establish a positive therapeutic relationship. Therapists provided psychoeducation on ASD in relation to problem solving … Sessions two through four focused on the importance of a positive problem orientation (PPO) in relation to problem solving … Students were taught how to recognize problems when they occur, how to

	challenge dysfunctional attitudes toward problem solving, how to regulate negative emotions, and how to use their emotions to facilitate problem solving effectiveness. Sessions five through eight focused on practicing discrete skills of the problem solving process, such as problem definition and formulation … using brainstorming techniques … decision making (e.g., screening out ineffective solutions, predicting possible consequences, evaluating solution outcomes, and developing a solution plan), and solution implementation including self-monitoring and self-evaluation of the solution outcome …. In session nine, students evaluated their attempts to implement their chosen solution and re-worked their solution plans, if necessary." pp720-1
Comparator description (if applicable)	N/A
Method of allocation (if applicable)	N/A
Baseline comparisons (if applicable)	N/A
Data collection methods	Social Problem Solving Inventory Revised: Long Form Outcome Questionnaire (general mental health, three subdomains: symptomatic distress, interpersonal relationships, and social role performance) Data collection process NR, presume self-report questionnaires.
Analysis methods	Reliable Changes Indices (RCI) reported for each participant individually [note these have been aggregated for purposes of data extraction]
Follow-up period	baseline, fortnightly in treatment (9 weeks), 2 months post
Results (effectiveness)	SPSI total score (calculated from individual participant data reported) pre 11.17 post1 12.50 post2 12.03 ("significant" RCI at post1 and post2 for 2 of 5 participants, sig NR for total sample). OQ total score (calculated from individual participant data reported) pre 43.48 post1 33.40 post2 36.20 ("significant" RCI at post1 for 2 of 5 participants, at post2 for 0).
Results (other)	(All satisfaction outcomes appear to be on an 0-10 scale.) Session helpfulness 7.40. Homework helpfulness 4.57. All but one reported gaining new knowledge in all sessions. (Also ratings for individual modules, data not extracted here.) Liked the programme 7.60. Found programme helpful 7.00. Satisfied with topics of meetings 8.00. "Using a forced choice response format, four participants identified the group meetings as being the 'most helpful' component of the program, whereas one found learning about how to improve problem solving style as being the most helpful. Two participants also identified learning about the actual problem solving process as being helpful. Anecdotally, participants appreciated learning new problem solving skills to promote a systematic approach to problem solving, the potential to apply these strategies outside of sessions, the opportunity to talk with others with ASD, and discussing how attitudes toward problems can affect the problem solving process." (p723). Participating in programme was a good use of time 6.20. Would recommend programme to another student 6.20. Continued to work on

	problems after programme ended 6.75. Felt that they had made progress 8.20. Applied skills from programme to other areas of life 7.00. Problem solving skills changed as a result of programme 7.20. Problem solving orientation has become more positive 7.60.
% attrition rate	NR
Limitations identified by author	Self-report measures, may be limited by people with ASD having difficulties with introspection. Impact of comorbidities (anxiety and depression) not explored. Possible that treatment was too short. Sample included only white men.
Limitations identified by reviewer	Sampling unclear. Non-comparative design. Small sample size. Authors' conclusions seem more optimistic than results warrant. Data analysis is non-standard and standard measures of statistical significance NR.
Study funding	partly by Graduate Research Development Program Dissertation Award at Virginia Tech

Saiano (2015)

Research question or focus	To evaluate the effectiveness of a virtual environment for teaching road safety skills to adults with ASD
Country of study	Italy
Sampling methods and eligible population	Inclusion criteria: Clinical diagnosis (confirmed by researchers) of ASD. Exclusion criteria: motor symptoms or severe stereotypy affecting translation of movements into interaction with the virtual environment; severe hypovision; inability to understand street signs; aggressive behaviour. No further information.
Recruitment methods	"recruited among the outpatients of the Department of Primary Care of the Local Health Authority of the city of Genoa" (p3). No further information.
% participation rate	NR
Sample demographics at baseline	Mean age 29, all male. Performance IQ 83. Full-scale IQ 73 of those with speech (N=4). (NB that 3 of 7 participants had IQ<70, and 2 participants with performance IQ≥70 were non-verbal.)
Sample size	7
Design	One-group uncontrolled
Intervention description	"The experimental apparatus included a video projector, displaying a virtual reality environment ... The screen continuously displayed a realistic city environment, including buildings, sidewalks, streets, and squares ... we used a markerless motion capture device (Microsoft Kinect), placed below the screen to record the subjects' full-body movements in 3D space." p3-4 "The study protocol consisted of a total of 10 sessions (1 session/week) and involved a familiarization (sessions 1–5) and a training (sessions 7–9) phase. ... During familiarization, a therapist observed the participants' behaviour and showed them the dictionary of gestures that are necessary to interact with the VE. ... Finally, the subjects were required to repeat the same movements on their own, with the therapist only providing verbal cues. The treatment phase consisted of three sessions (maximum duration: 45 min). During each session, the participants had to complete two different paths (A and B), by following arrows and signs. ... Subjects had to complete each path within a time limit of 10 minutes, then the

	software application switched to the next one. Over sessions we gradually increased task difficulty. In the first session the path only included crosswalks, without traffic lights. Subjects had to stop and look at both sides of the street before crossing a road. In the second session, all crosswalks had traffic lights. In this case, subjects were also required to wait for the green light before crossing. In the third session, there were both types of crosswalks (with and without traffic lights) plus a number of distractors (other people, dogs, street noise). All errors - i.e. crossing without looking, crossing with red/ yellow light, walking outside the sidewalk or crossing outside the crosswalk – automatically triggered an acoustic alarm." p4-5
Comparator description (if applicable)	N/A
Method of allocation (if applicable)	N/A
Baseline comparisons (if applicable)	N/A
Data collection methods	Errors in task (automatically measured by application): (i) crossing without looking, (ii) crossing with red/yellow light, and (iii) walking outside the sidewalk or crosswalk. (Also various measures of speed and 'quality' of path chosen, not relevant to this review.) Quiz for participants (6 questions) Questionnaire for parents/caregivers asking about safety behaviours
Analysis methods	Paired t-tests/Wilcoxon
Follow-up period	4 weeks from baseline (baseline measure was at session 6 – previous sessions being described as 'familiarisation' – and post-test 1 week after final (10th) session)
Results (effectiveness)	(For error outcomes, means recalculated from individual data in figures). Crosswalk errors pre 6, post 7 (ns). No look errors pre 13, post 3 (ns). Traffic light errors pre 12, post 2 ($p<0.05$). Quiz wrong answers pre 28% post 8% (ns) Parent questionnaire (estimated from figure) pre 17 post 23 ($p<0.05$); caregiver questionnaire pre 18 post 23 ($p<0.05$).
Results (other)	"No participant refused to use the system. Subjects were often tired at the end of the experimental sessions, but they always promptly agreed to come back for the next session…. Ane[c]dotally, we further observed that our subjects not only gladly agreed to use the system, but they actually enjoyed it." (p9)
% attrition rate	14% (1/7)
Limitations identified by author	Depth perception difficulties caused a participant to drop out; intervention inaccessible to this group. Study does not allow conclusions about real-life skill improvement. Small sample size and low power.
Limitations identified by reviewer	Small sample. Non-comparative design. Short follow-up. Measures used provide limited information about real-world performance. Study is borderline exclude for this review w/r/t population (only 4 of 7 did not have learning disability, and two of those were non-verbal).

Study funding	Italian Ministry of Education, University and Research; Italian Ministry of Foreign Affairs

Smith (2014)

Research question or focus	To evaluate the feasibility and efficacy of virtual reality (VR) job interview training for adults with ASD
Country of study	USA
Sampling methods and eligible population	"A non-specific diagnosis on the autism spectrum was required for participation in this pilot study and was determined with a T-score of 60 or higher using parent and self-report versions of the Social Responsiveness Scale ... Participants were also required to (1) have at least a 6th grade reading level as determined by the sentence comprehension subtest of the wide range achievement test-IV … (2) be willingly video-recorded, (3) unemployed or underemployed (i.e., working less than half time and looking for additional work), and (4) actively seeking employment. Participants were excluded from the study for (1) having a medical illness that significantly comprises cognition (e.g., traumatic brain injury), (2) an uncorrected vision or hearing problem, which would prevent full participation in the intervention, or (3) having a current diagnosis of substance abuse or dependence as assessed using the MINI international neuropsychiatric interview" (2014 p2452)
Recruitment methods	"… recruited through advertisements at community-based service providers, local universities, community-based support groups (e.g., Anixter Center, Chicagoland Autism Connection, Autism Society of Illinois, Illinois Department of Rehabilitation Services), and online (e.g., Facebook)." (2014 p2452)
% participation rate	NR
Sample demographics at baseline	Age 25 int, 23 con. Male 75% int, 80% con. Int 50% Caucasian, 25% African American, 25% other. Con 40% Caucasian, 30% African American, 30% other. Prior paid employment 62.5% int, 30% con.
Sample size	26 (16 int, 10 con)
Design	RCT
Intervention description	"Virtual reality job interview training (VR-JIT) is a computerized virtual reality training simulation that can be used as computer software or via the internet. … VR-JIT uses non-branching logic, which provides users with variation and freedom in their responses and provides a virtual reality interviewer displaying a wide range of emotions, personality, and memory. The non-branching nature of the interview creates a different interview each time from 1,000 video-recorded interview questions and 2,000 trainee responses, the novelty of which further encourages repeated plays. … The job-relevant interview content included: conveying oneself as a hard worker (dependable), sounding easy to work with (teamwork), conveying that one behaves professionally, and negotiating a workable schedule. Interviewee performance included: sharing things in a positive way, sounding honest, sounding interested in the position, and establishing overall rapport with the interviewer. Virtual reality job interview training uses the following strategies to target improvement in the aforementioned domains: (1) providing repeatable VR interviews, (2) offering in-the-moment

	feedback, (3) displaying scores on key dimensions of performance, and (4) allowing review of audio and written transcripts colour coded for 'strong,' 'neutral,' or 'needs improvement' interview responses." (2014 p2452) "Following the completion of baseline measures, the intervention group was asked to complete 10 h (approximately 20 trials) of VR-JIT training over the course of 5 visits (within a 2-week period) … Then, participants began a trial run by creating a practice job application and engaging in a single practice session to demonstrate that they could navigate VR-JIT. Staff provided feedback and assistance until the participant felt ready to begin. VR-JIT was administered in private offices to provide a safe environment where participants felt comfortable using the speech recognition component. Participants were encouraged to use the e-learning materials prior to each simulated interview. To promote hierarchical learning, participants were required to progress through three difficulty levels. First, at least three ''easy'' interviews needed to be completed. One score of 80 or higher was required to advance to the ''medium'' level. Participants were automatically advanced to medium if a score of at least 80 was not achieved prior to 5 completed interviews. This process was repeated for participants at the ''medium'' level before advancing to the ''hard'' level. Participants played on the ''hard'' level for the remainder of training." (2014 p2453-4)
Comparator description (if applicable)	"Treatment as usual", no further information
Method of allocation (if applicable)	Random (method NR), with 2/3 chance of intervention and 1/3 control, "to enable us to learn more about the intervention process." 2014 p 2452
Baseline comparisons (if applicable)	Age, gender, parent education, race, vocational history, social responsiveness scale, cognitive function. Significance tested.
Data collection methods	For original (2014) study: "Role-play videos were randomly assigned to two raters who were blinded to condition. The raters had expertise as HR interviewers, and were trained with 10 practice videos before independently rating the study videos." p2455 They rated on the following: 1) comfort level, (2) negotiation skills (asking for Thursdays off), (3) conveying oneself as a hard worker (dependable), (4) sounding easy to work with (teamwork), (5) sharing things in a positive way, (6) sounding honest, (7) sounding interested in the position, (8) conveying that one behaves professionally, and (9) establishing overall rapport with the interviewer. Participant self-confidence. "Participants rated their confidence in performing job interviews using a seven-point Likert's scale to answer nine questions (e.g., ''How comfortable are you going on a job interview?'' ''How skilled are you at making a good first impression?'' and ''How skilled are you at maintaining rapport throughout the interview?''). Total baseline and follow-up job interview self-confidence scores were computed." p2455 (Also an algorithmic score based on appropriateness of responses within the VR environment; this was collected as a process measure only and is not reported pre and post.)

	For follow-up study (2015): "Participants were contacted via the phone or through email and instructed to complete a brief follow-up survey. They were not specifically encouraged to rely on caregiver support to accurately answer the questions. The survey included seven questions that asked participants to reflect on the past 6 months since their completion of the efficacy study. Specifically, they were asked: (1) How many weeks have you been looking for a job or volunteer work?; (2) How many job interviews have you completed?; (3) How many jobs have you been offered?; (4) Did you accept any of these job offers? If yes, how many?; (5) ‘‘How many volunteer interviews have you completed?’’; (6) How many volunteer positions have you been offered?; and (7) Did you accept any of these volunteer offers? If yes, how many?" p 3366 (NB these outcomes only collected at 1 time point, but extracted here as study was randomised)
Analysis methods	Descriptive, ANOVA, chi-square, logistic regression
Follow-up period	6 months (in 2015 paper; 2 weeks in 2014 paper)
Results (effectiveness)	At 2 weeks. Role-play performance total score int pre 29.5 post 32.7 con pre 28.2 post 28.5 (sig group x time interaction). Subdomains: Job-relevant interview content score int pre 13.5 post 14.6, con pre 12.7 post 12.8 (sig NR); interviewee performance score int pre 16.2 post 18.0 con pre 15.5 post 15.7 (sig NR). (Full breakdowns by specific domains also reported, not extracted here.) Self-confidence int pre 41.4 post 50.6 con pre 41.0 post 43.8 (borderline sig (p=0.06) group x time interaction). Main effect of group not significant in ANOVA. At 6 months. Weeks looking for position (job or volunteer) int 13.5 con 10.9. Interviews completed int 2.1 con 1.9. Completed an interview int 80.0% con 62.5%. Received offer int 60.0% con 50.0%. Accepted a position int 53.5% con 25.0% (all ns). Logistic regression shows adjusted OR of accepting a competitive position as 7.82 (1.03-59.4) for int group relative to controls. (NB this analysis controlled for post-test confidence, which was an outcome at 2 weeks).
Results (other)	Training experience questionnaire (7-point Likert scale). Ease of use 5.8. Enjoyable 5.1. Helpful 5.4. Instilled confidence 5.4. Prepared for interviews 5.8.
% attrition rate	At 2 weeks: NR. At 6 months: 12% (3/26)
Limitations identified by author	Diagnostic instruments not delivered by trained clinician. Participants were actively seeking employment and so may be subject to selection bias. Insufficient statistical power due to small sample size. Employment outcomes not validated by supervisors.
Limitations identified by reviewer	Limited information on regression analysis in 2015 paper.
Study funding	National Institute of Mental Health, "Department of Psychiatry and Behavioral" [*sic*]. Three authors have financial interests in company producing VR training programme.

Strickland (2013)

Research question or focus	"The current study evaluated the effectiveness of a treatment package comprised of a web-based interviewing skills program

	(JobTIPS) and virtual reality practice on responses to employment interview questions by adolescents with high functioning autism and Asperger's Disorder." p2474
Country of study	USA
Sampling methods and eligible population	"Inclusion criteria were that the participant was between the ages of 16 and 19 years, had a clinical diagnosis of a pervasive developmental disorder, and was characterized by the primary caregiver on the screening form as having a form of 'high functioning autism' or Asperger's Disorder. Additionally we required that potential participants have regular access to a home computer with an internet connection, and could perform basic computer and website navigation functions independently. Any individual with vision, hearing, or motor problems that would prevent participation in the virtual reality practice session or interview simulations was ruled out and we required that the participant had never been competitively employed nor viewed the JobTIPS website." p2474
Recruitment methods	"...recruited from a large southeastern metropolitan area through postings and mailings. Recruitment flyers and letters, whose content was approved by the Emory University School of Medicine's Internal Review Board (IRB), were posted at two large autism treatment centers, and were mailed to other agencies serving adolescent and young adults with ASD." "Consent forms, approved by the Emory University Internal Review Board (IRB), detailing the study were mailed if the caregiver and/or individual with ASD indicated interest in participating and met all criteria. If the participant was under 17 years old, these forms included consent for the parent/legal guardian to allow a minor to participate, a written assent form and an additional consent form for the parent/legal guardian to participate as a subject in answering a questionnaire." p2474
% participation rate	NR
Sample demographics at baseline	100% male, mean age 18. Int 18.2% African American, 72.7% white, 9.1% other; con 27.3% African American, 63.6% white, 0% other. Socioeconomic status int 6.70 con 6.82 (scale 1-9). Years of school int 11.32, con 11.00
Sample size	22
Design	RCT
Intervention description	"The intervention used the JobTIPS program, a multimedia employment training program … that offers five sections to guide the individual with ASD through the process of ''Determining Career Interests,'' ''Finding a Job,'' ''Getting a Job,'' ''Keeping a Job'', and ''Other Job Topics'' like ''Leaving a Job.'' The program includes step-by-step instructions often paired with icons to support comprehension, embedded video models and video scenarios, video quizzes, and printable scripts, worksheets, organizational tools, and social narratives. … JobTIPS subsections … targeted responses to standard interview questions. These sections were: behavioural interview questions … situational interview questions … the nonverbal behaviours that accompany those responses, and concrete explanations of the norms and expectations (from the perspective of the employer) that govern those responses. … The subsections entered on the following

	topics: ‘‘Interview Overview,’’ ‘‘Think Like the Interviewer,’’ ‘‘Respond Like a S.T.A.R.,’’ ‘‘Rehearsing Responses to Questions,’’ ‘‘Greetings and Handshakes,’’ ‘‘During the Interview’’ and ‘‘The End of the Interview.’’ To promote learning by comparison, most subsections included captioned videos depicting both the more and the less appropriate responses in a given situation. Also embedded within most subsections were printable summaries, graphic organizers, worksheets, and visual reminder cues, all of which were printed and compiled within a binder for each treatment group participant." p2474-5 "The virtual world practice session was conducted via the Venugen platform (http://www.venuegen.com/) in a basic office environment where individual interview practice simulations were led remotely by a clinician at a different physical location who had experience in autism intervention." p2476 For the practice session the clinician appeared via avatar and the participant interacted with them using headphones and speaker.
Comparator description (if applicable)	No intervention
Method of allocation (if applicable)	Random, method NR
Baseline comparisons (if applicable)	Gender, age, ethnicity, SES, years of schooling, medication. Significance testing conducted.
Data collection methods	Interview skills rating instrument: "In collaboration with human resources experts, researchers developed an Interview Skills Rating Instrument with two sub-scales: Response Content: A 10 item scale that measures the content of the participant’s responses to 10 interview questions; and Response Delivery: 20 items that measure behaviours related to greetings and farewells (handshakes, eye contact, verbal greeting, verbal expression of appreciation at end of interview), as well as the non-verbal behaviours (e.g., body positioning, facial expressions) that accompany verbal responses during the actual interview questioning period. " p2477 (Social Responsiveness Scale measured at one time point (unclear which) as moderator, rather than as effectiveness outcome.)
Analysis methods	ANOVA, chi-square, Pearson Product Moment
Follow-up period	~9 days from baseline
Results (effectiveness)	Interview Rating Scale (change scores). Content Scale int +0.448 con -0.034 ($p<0.05$); Delivery Scale int +0.334 con +0.252 (ns).
Results (other)	None
% attrition rate	Apparently 0%
Limitations identified by author	All male. Participants volunteered and were probably highly motivated. Short follow-up. Unclear if effects generalise to novel situations.
Limitations identified by reviewer	Limited information on control group.
Study funding	NIH/NIMH

Turner-Brown (2008)

Research question or focus	To evaluate the feasibility, and provide initial data on the effectiveness, of a social-cognitive programme for adults with high-functioning autism.
Country of study	USA
Sampling methods and eligible population	Inclusion criteria: age 18-55; confirmed diagnosis of ASD; full-scale IQ (Wechsler) 'in the average range'. No information on sampling as such.
Recruitment methods	"... recruited from Division TEACCH, a state agency that provides services for individuals with autism in North Carolina (n = 12), and psychologists in the community (n = 1)" (p1778). No further information.
% participation rate	NR
Sample demographics at baseline	Age 42.5 int, 28.8 comp. IQ 113 int, 111 comp. 10 of 11 male, 9 of 11 'Caucasian'.
Sample size	11 (6 int, 5 comp)
Design	RCT. "Group assignments were initially determined randomly. However, two individuals assigned to the treatment condition opted not to participate in SCIT-A. One participant had conflicts with his job and the other changed his mind. Due to the small sample size of this pilot study, these participants were reassigned to the control condition. Therefore, this study is not a true randomised controlled design, but should be considered a quasi-experimental design." (p1778)
Intervention description	Social Cognition and Interaction Training. Group social-cognitive education programme, originally developed for people with psychosis, modified for adults with high-functioning autism (SCIT-A). 1 session/week for 18 weeks (each ~50 mins). Three phases overall: emotion training and being aware of social cues; figuring out situations and distinguishing socially relevant from socially irrelevant facts; and integrating guesses into real life. Programme used videoed examples of situations e.g. of inappropriate behaviour; participants had to identify the social cues that signalled inappropriateness.
Comparator description (if applicable)	Treatment as usual. "Participants in both groups continued to receive other treatments. These data were available for 4/6 participants in the SCIT-A group (data are unavailable from one participant, and one participant declined to report this information). All were receiving a combination of job skills coaching, medication management, and/or individual therapy. Participants in the TAU group continued to receive other interventions (e.g., individual therapy, job skills coaching) during the SCIT-A trial. No participants in either group were participating in other group-based interventions concurrently with their participation in this study."
Method of allocation (if applicable)	Initially random, but two participants were reassigned from intervention to control group after opting not to participate in intervention.
Baseline comparisons (if applicable)	Intervention participants significantly older and fewer non-white participants than control; not sig diff on IQ or gender

Data collection methods	Social Communication Skills Questionnaire (SCSQ; self-report) Social Skills Performance Assessment (SSPA): "a role-play assessment in which the subject participates in three conversations for 3 min each on predetermined topics (e.g., ‘‘your landlord has not fixed a leak that you told him about last week, and now you are calling him on the phone to follow-up’’). … All roleplays were audio-taped and rated by observers blind to group status and to pre- or post-treatment status. For each role-play, ratings of interest, fluency, clarity, focus, affect, social appropriateness, and conversation, were provided. Across the three role-plays, a total of 16 skills were rated. Each skill was scored on a 1–5 scale, with higher scores reflecting stronger social skill." (Also cognitive measures, not in scope of this review.)
Analysis methods	t-test, ANOVA
Follow-up period	NR; presume at end of programme
Results (effectiveness)	Results are only presented as raw data for each participant (Table 3, not extracted here) and the results of the ANOVAs. SCSQ: no sig main effect of group or time; group x time near-sig ($p<0.10$). SSPA: no sig main effect of group or time or group x time interaction (all $p>0.20$).
Results (other)	Rated ‘useful’/’very useful’ 5/6. “The first open-ended question asked participants what they liked about the group. Answers included the size, topics covered, flexibility of group leaders, and opportunity to meet other adults with HFA. The second open-ended question asked what members did not like about the group. Respondents indicated that they wished that sessions had lasted longer, that they had more opportunity outside of the group to practice skills, and that this type of group had been available to them when they were younger.” (p1781)
% attrition rate	15% (2/13)
Limitations identified by author	Not true RCT design. Small sample size.
Limitations identified by reviewer	None
Study funding	National Institute of Mental Health, Foundation of Hope (NC), North Carolina Division TEACCH.

Wehman (2014)

Research question or focus	To evaluate the effectiveness of the Project SEARCH intervention for students with ASC
Country of study	USA
Sampling methods and eligible population	Inclusion criteria for programme: age >18; ASD diagnosis; independently able to self-care; could provide consent; eligibility for special educational services in high school. Exclusion: history of fire setting or drug abuse; limited support needs not requiring intervention; extensive support needs including self-care
Recruitment methods	"Participants in this study were students in two public special education programs in Virginia prior to inclusion in this Project SEARCH plus ASD Supports replication. They applied to become Project SEARCH interns in their final year of high school. The

	application process required applicants or their proxy to complete a written detailed application." p489
% participation rate	NR strictly as NR how many were in the educational programmes who had the opportunity to participate. N=70 filled out an application, N=44 met eligibility criteria, N=40 participated at baseline (4 dropouts post randomisation, all from control group)
Sample demographics at baseline	Mean age 20 int, 19 con. 75% male int, 68% con. Int 1.7% African American, 58.3% white, 0% Asian; con 46.7% African American, 46.7% white, 6.7% Asian. Diagnosis int autism 62.5%, PDD NOS 25%, Asperger's 12.5%; con autism 81%, PDD-NOS 12.5%, Asperger's 6.3%.
Sample size	40
Design	RCT
Intervention description	"The students in the treatment group received a full year of exposure to Project SEARCH plus Supports for students with ASD (Wehman et al. 2013) in their final year of high school." p489 "In this study, participants rotated through numerous internships in two different suburban hospitals. … The beginning and end of each school day is spent in a classroom located on the business site learning job skills and social communication behaviours. This model is designed for youth with developmental disabilities who are seeking employment upon graduation from high school … The specific ASD supports that were added to the Project SEARCH Model for this project included: (1) onsite, intensive, systematic instruction using the principles of applied behaviour analysis, (2) on-site support and consultation from a behaviour/autism specialist, and (3) intensive staff training in ASD and the Project SEARCH Model. ... These additional supports were applied on an individual basis for participants based upon their needs and allowed the team to implement the model for the participants previously described as requiring increased support for behavioural challenges. … The Project SEARCH plus ASD Supports intervention team was composed of an interdisciplinary team of individuals who worked together to ensure the success of the students in the Project SEARCH plus ASD intervention. At each of the two intervention sites, the team included a full time special education teacher and instructional assistant, two full time employment specialists and a business liaison who dedicated a minimal amount of his full time job to the project. In addition, an offsite team provided oversight, ensured collaboration and fidelity of implementation of the Project SEARCH plus ASD Supports Model and managed recruitment efforts. That team included a project director, a positive behaviour support facilitator and research director from the research university, a rehabilitation counsellor from VR, and an autism or transition specialist from the LEA." p491 "Those students assigned to the Project SEARCH plus ASD Supports group attended their final year of high school at the host businesses, which were (1) a 391 bed suburban hospital with adjoining medical office buildings and (2) a 130 bed suburban hospital with adjoining medical office buildings in Richmond,VA. During their year in the ProjectSEARCHplus ASD Supports program, treatment group participants attended class on the business site for approximately 1 h, 45 min during the school day then rotated through three different internships in the hospital throughout the school year. The classroom curriculum was focused entirely on the

	acquisition of work skills and work related adaptive behaviour including: getting to and from work on public transportation, using a cell phone to call in sick, asking for help, accepting supervisor and coworker correction, independently navigating the hospital, focusing only on work tasks at work, etc. These students also received a program composed of ‘‘braided services.’’ More specifically, they received their educational supports through the LEA while also receiving case management through VR and job coaching through the CRP." p493
Comparator description (if applicable)	"The control group received their education in their home high school following their individualized education programs. This condition was referred to as ‘‘business as usual’’ as these students did not receive any services or supports other than those planned for in their IEP’s." p489 "Students assigned to the control group continued to receive the educational supports and services as identified in their individualized education programs (IEP’s) without interaction from the Project SEARCH staff or research team beyond intervals of data collection on outcomes." p491
Method of allocation (if applicable)	Random by random number generator, conducted by colleague without connection to study
Baseline comparisons (if applicable)	Age, gender, race, medical diagnosis, IEP eligibility category (Autism, Intellectual Disability, Other health impaired, speech language impaired, multiple categories). No sig diffs on demographic variables; sig higher medical and support needs, and current psychotropic medicine use, in intervention than comparison group.
Data collection methods	Interview collecting data on current employment, wages, hours worked, and employer paid benefits Supports Intensity Scale
Analysis methods	Descriptive, t tests, chi square
Follow-up period	At end of 9 month intervention and after a further 3 months
Results (effectiveness)	Employment int pre 0% post1 (9mo) 87.5% post2 87.5% con pre 0% post1 6.25% post2 6.25% ($p<0.05$ for between-group difference at post1 and post2). SIS Employment Activities subscale int pre 8.74 post1 8.23 post2 7.65, con pre 8.33 post1 8.36 post2 8.58 ($p<0.05$ for between-group difference at post2). (Also data on hours worked and wages, but these only reported for int group at one time point; the N=1 control participant who was employed did not provide data on these outcomes.)
Results (other)	None
% attrition rate	Apparently 20% (8/40)
Limitations identified by author	Some dropouts prior to baseline data collection. Diagnoses unconfirmed. Unclear what services were received by control group. Only one centre and findings may not be generalisable. Findings not generalisable to people with greater support needs.
Limitations identified by reviewer	Limited information on control group. Non-reporting of some outcomes (full SIS was measured at baseline but only Employment Activities subscale reported at post-test). Unclear attrition.
Study funding	National Institute on Disability and Rehabilitation Research

White (2015)

Research question or focus	To validate an observational social skills measure to assess change after a group social skills intervention
Country of study	presume USA
Sampling methods and eligible population	Incl. criteria: age 18-28; documented ASD diagnosis; have parent or other adult able to serve as assistant; no intellectual disability (Kaufman); no psychopathology needing more immediate or intensive treatment. No information on sampling as such.
Recruitment methods	NR
% participation rate	NR
Sample demographics at baseline	All male, all 'Caucasian'. Mean age 24. Mean IQ 92. Diagnosis 60% Asperger's, 20% autistic disorder, 20% PDD-NOS. All completed high school, 60% some college.
Sample size	5
Design	One-group uncontrolled
Intervention description	PEERS-Young Adult. "The PEERS-YA sessions are delivered in a small-group format, with concurrent groups for the adults with ASD and for their caregivers (usually the parents). Each session focuses on a particular lesson, or skill, related to building interpersonal relationships (e.g., organizing get-togethers, dating etiquette). PEERS-YA targets social independence in the young adult with ASD through directive teaching, rehearsal, role-play, feedback, and weekly homework. ... In the present study, the intervention was implemented by two graduate student clinicians, one of whom led the young adult group, whereas the second led the assistant group. Therapists were supervised by two licensed clinical psychologists and were trained by the PEERS developers." p6
Comparator description (if applicable)	N/A
Method of allocation (if applicable)	N/A
Baseline comparisons (if applicable)	N/A
Data collection methods	Contextual Assessment of Social Skills. Two 3-minute role-play conversations with opposite-gender confederate. Aims to measure conversational skills and particularly ability to adapt behaviour depending on change in social context (e.g. cues of lack of interest). Conversation videotaped and behaviour graded across four core domains (Asking Questions, Topic Changes, Overall Involvement, and Overall Quality of Rapport) and five exploratory domains (Social Anxiety, Kinesic Arousal, Vocal Expressiveness, Gestures, and Positive Affect). Raters were trained and reliability tested before conducting assessments. Raters were blind to time point (pre/post). Social Adaptation Index (ability to adjust behaviour when conversational partner disinterested; unclear if this is an aspect of the CASS or a separate measure)

	(Also three other measures - Social interaction Anxiety Scale, Social Phobia and Anxiety Inventory-23, Social Responsiveness Scale - but outcome data are not reported for these (they appear to be included as checks on validity)).
Analysis methods	Descriptive statistics; Reliable Change Index
Follow-up period	At end of intervention (14 weeks from baseline).
Results (effectiveness)	Core I-CASS domains (expressed as pre-post change scores; recalculated from raw scores in report). Asking questions +1.14; topic changes +1.04; overall involvement +4.04; quality of rapport +1.16; social anxiety +1.46. (Clinical significance as assessed by RCI for 10 of 25 change scores, of which 9 positive.) Social Adaptation Index positive changes in 3/5 participants, clinically significant in 1 case (full data not reported). Also data on exploratory domains of CASS (not extracted here as interpretation is unclear).
Results (other)	None
% attrition rate	NR explicitly; appears to be 0%
Limitations identified by author	Small sample. Social Adaptation Index results depend on sample characteristics. No comparison group. Autism diagnoses not independently confirmed for study.
Limitations identified by reviewer	Focus of study is on validating outcome measure rather than evaluating intervention, so limited detail reported on the latter. The interpretation of the results is not always clear. Only RCI analysis and not standard measures of statistical significance.
Study funding	None

Economic studies

Howlin (2005)

Research question or focus	To evaluate the cost per job found of the Prospects employment service
Population and setting	Adults with autism or Asperger's in UK (London, Manchester, Sheffield, Glasgow)
Data sources	Information on employment and benefits status from agency record. Cost data unclear - partly from agency records.
Intervention description	Specialist supported employment service; see Mawhood study for full details of intervention
Comparator description (if applicable)	N/A
Baseline comparisons (if applicable)	N/A
Costs included	Unclear
Outcome measures (benefits)	Jobs found (benefits payments are also mentioned as a possible outcome of the intervention, but are not clearly related to costs)
Time horizon	N/A
Discount rate used	N/A
Perspective	Unclear
Measures of uncertainty	None

Modelling methods	Unclear
Results for primary analysis	Cost per job found: £6542 in 2000–1, £4281 in 2002–3.
Results for secondary analyses (sensitivity analyses)	N/A
Limitations identified by author	NR
Limitations identified by reviewer	CBA is very brief part of general overview paper; no information on methods or data sources; no discussion of wider benefits or CEA
Study funding	NR

Mavranezouli (2014)

Research question or focus	To examine the cost-effectiveness of supported employment for adults with autism in the UK
Population and setting	Adults with HFA (IQ≥70), living in London area, seeking work
Data sources	Mawhood and Howlin (1999) and Howlin et al. (2005) for effectiveness estimate - this based on systematic review of effectiveness data; utility data from previous model; costs mainly from Curtis (2012)
Intervention description	Prospects supported employment service (see data extraction of Mawhood effectiveness study for details)
Comparator description (if applicable)	Standard care (day services)
Baseline comparisons (if applicable)	N/A
Costs included	Based on Curtis (2012): salaries according to NHS salary bands, divided by caseload
Outcome measures (benefits)	Employment and consequent utility gain (NB based on general population data, not autism-specific); moving out of supported accommodation into private accommodation; NHS and personal services costs (mental health, primary and secondary care, local authority and voluntary day care services; NB not autism population)
Time horizon	9.5 years (17 months of intervention + 8-year follow-up)
Discount rate used	3.5%
Perspective	NHS + personal social services
Measures of uncertainty	Costs of intervention & of comparison
Modelling methods	Decision tree with two-state Markov model ('employed'/'unemployed'); model ran in yearly cycles. Input parameters varied probabilistically. Results of 1000 model iterations reported.

Results for primary analysis	£18 per extra week in employment. ICER of supported employment vs standard care: £5600/QALY (journal article); £1,467/QALY (report). When accommodation costs included as well as utility, supported employment dominated usual care.
Results for secondary analyses (sensitivity analyses)	"if the intervention cost of supported employment increased by 40% or the standard care cost decreased by 40%, the ICER rose at approximately £62 per extra week in employment or £19,000/QALY, the latter being below the NICE lower cost-effectiveness threshold of £20,000/QALY. If, on the other hand, the intervention cost of supported employment fell by just 10% or the standard care cost increased by 10%, then supported employment became dominant. Threshold analysis revealed that the minimum risk ratio of supported employment versus standard care required in order for the intervention to be considered cost-effective according to NICE criteria was 1.63 (using the lower £20,000/QALY threshold), while the main analysis utilised a mean risk ratio of 2.53 (95% confidence interval (CI) = 1.13 to 5.67), as reported in Mawhood and Howlin (1999)." (p1980)
Limitations identified by author	Effectiveness data from one study with small sample size and may be limits to generalisability. Effectiveness data is from mid-1990s and may not transfer to current conditions. Findings are on adults with HFA and do not generalise to adults with autism and learning disability. Utility scores drawn from general population and may under-estimate benefits of employment for people with autism. Model does not consider broader benefits e.g. social inclusion from employment.
Limitations identified by reviewer	Limitations in effectiveness estimate. Limited range of parameters selected for sensitivity analysis. Divergence in ICER figure between journal article and report.
Study funding	National Institute for Health and Care Excellence

National Audit Office (2009)

Research question or focus	"to analyse the potential financial impacts of providing specialist multi-disciplinary services for adults with high-functioning autism/Asperger Syndrome across England" (p46)
Population and setting	Adults with HFA / Asperger's in England
Data sources	Employment service effectiveness from Mawhood and Howlin study (q.v.); prevalence data from CDC; data on identification rate, service use, accommodation etc. from specialist service providers
Intervention description	Multi-disciplinary support team (based on three existing specialist services for Asperger's: Liverpool, Kingston and Northamptonshire). Services provide diagnostic assessment and coordinate other services for clients, including therapeutic interventions, employment support, liaison with other services etc. The emphasis in terms of the benefits modelled is on improving diagnosis, helping people to live independently, and helping people find employment.
Comparator description (if applicable)	N/A

Baseline comparisons (if applicable)	N/A
Costs included	Staff grades and hours from contact with service providers. Unit costs from Curtis, *Unit Costs of Health and Social Care*
Outcome measures (benefits)	Increased diagnosis (indirectly); use of crisis services; use of acute inpatient care; increased employment (benefit is earnings, rather than utility); use of residential care and supported employment; lost employment and family expenses for informal carers
Time horizon	Implicitly, 1 year ("The model is therefore a snapshot rather than a detailed year-on-year cost-benefit appraisal based on timed and discounted cashflows" Technical Report p2); effectiveness data for employment service come from 8-year follow-up
Discount rate used	N/A
Perspective	NHS + Local Authorities + private individuals (note model only takes into account direct cost savings and does not value non-monetary benefits)
Measures of uncertainty	Sensitivity analyses on full range of input parameters (Technical Report, fig 10)
Modelling methods	Decision tree incorporating availability of specialist team, diagnosis and employment support. Benefits modelled statically using data on probability of service use over 1 year. Monte Carlo for sensitivity analyses.
Results for primary analysis	80% chance of intervention being cost saving. For base case (identification rate 4%), benefit to public sector of £200 per 1000 working-age population (95% CI -900 to 1800); benefit to private individuals £200 (100-500). Benefit to public sector includes cost of £100 to DWP (0-300), benefit of £1100 to local authorities (-100 to 3000), and cost of £800 to NHS (700-900).
Results for secondary analyses (sensitivity analyses)	For lower identification rate (2%): cost to public sector £700 per 1000 working-age individuals (95% CI 200-1200), benefit to private individuals £200 (0-300). For 'realistic' higher identification rate (8%): benefit to public sector £2100 (-200 to 6000), to private individuals £400 (100-900). For best recorded rate from Liverpool team (14%): benefit to public sector £5000 (600-12000), to private individuals £700 (200-1500). (NB that distribution of benefits to public sector is similar in all these analyses, viz. small net costs to DWP and NHS offset by larger savings to local authorities.) Model is also somewhat sensitive to probability of supported accommodation and residential care, and population prevalence of HFA / Asperger's. Varying these parameters leads to considerable variation in net cost savings, although still >0 in most realistic scenarios.
Limitations identified by author	Model does not take into account other potential savings e.g. through reduced interaction with criminal justice system. Evidence base on service use and housing may not be reliable. Model does not take account of out-of-area placements.
Limitations identified by reviewer	Future costs and benefits not modelled beyond 1-year horizon. Increased utility not valued. Increased identification rate drives many benefits, but appears to assume that individuals not yet identified have similar scope to benefit as populations in effectiveness studies. Other than Mawhood and Howlin data on employment (which has some limitations), data on impact of services is observational and not based on trial evidence.

Study funding	National Audit Office

Qualitative studies

Ford (2012)

Research question or focus	To conduct a process evaluation, and produce logic models, of college student support services for students with HFA / Asperger's
Country of study	USA
Sampling methods and eligible population	Sampling frame based on previous lists and web-based resources for college students with HFA/Asperger's, and Google searching. Focus on programmes which offer individualised support to students enrolled on degree programmes (not just non-credit courses). From this, selected two programmes so as to sample "one program that represents an institution-created model and one program that represents the private for-profit model" (p58).
Recruitment methods	Potential institutions were ranked according to convenience of access. Researcher approached senior programme administrators who provided institutional permission and a list of programme staff as potential interviewees
% participation rate	Apparently 100% for institutions; NR for individual participants
Sample demographics at baseline	Institutions were one for-profit multi-site residential support programme, and one programme in a public four-year college with a high undergraduate population (Marshall University, Huntington, West Virginia). All participants were programme staff, but no information is reported (either on demographics etc., or on role).
Sample size	11
Intervention description	(1) Programme at public university offering "individualized academic, social and life skill supports so that students with autism spectrum disorders may have a successful college experience" (p67). Run by an Autism Training Centre which offers support services to people with autism more generally. Programme serves ~30 students at a time. Programme emphasises positive behavioural support and collaborative assessment process. Students apply, undergo an interview and are accepted if staff think they will benefit from services. Students pay US$3,200 / semester for the programme (on top of tuition, room and board etc.), with varying scale for different levels of support. Programme has two full-time staff with extensive experience working with autism and 11 part-time graduate assistants (mostly counselling students). Person-centred planning process for incoming students. The graduate assistant assigned to work with the student gives information about them to academic staff; they meet with students daily to help them with organizing academic work and any other concerns; and offer ongoing training for staff. The programme also organises social and leisure activities and 'discovery groups' (essentially a social skills training programme). Support is also available with independent living, medication compliance etc. (2) Programme is run by a private for-profit special education provider. Programme provides services to a range of populations other than ASC (e.g. ADHD, developmental disorders, mood disorders). Tuition is US$33,500/year plus $1,500 joining fee. Students are assessed for

	admission based on potential benefit and ability to live independently. Programme as a whole has 10 full-time and 25 part-time staff including tutors, mentors and independent living instructors. Students can use dedicated space, computers and specialist adaptive learning software. The programme offers one-to-one academic tutoring and support including skills for independent living (e.g. cleaning, personal hygiene), and organises social activities.
Data collection methods	Individual interviews; no further information. (Also analysis of programme documents and some form of observation, not described in any detail.)
Analysis methods	Thematic analysis using logic model as a framework. Data were triangulated between interviewees and between different sources (interviews, documents, observation).
Limitations identified by author	NR
Limitations identified by reviewer	Aim of study is to populate logic models rather than to engage more critically with how the programmes operate; the data are mainly descriptive and provide little insight into barriers and facilitators, or broader contextual factors which might impact on the programmes. Only programme staff interviewed, not service users. Limited information on some aspects of methods (particularly sampling individual participants and data collection).
Study funding	NR

Fullerton (1999)

Research question or focus	To evaluate a programme designed to increase self-determination in young adults with ASC
Country of study	USA
Sampling methods and eligible population	Unclear. Appears that all people receiving intervention were approached for participation, but not clearly stated. Parents of those in one of the three classes (N=8) were approached.
Recruitment methods	"The students were asked to be participant evaluators [presumably by staff delivering intervention] and received a small honorarium for this service" p45. NR for parents.
% participation rate	Between 83% and 100% (see under sample size) for students. Apparently 100% for parents.
Sample demographics at baseline	All HFA or Asperger's; age 16-28 years; 43% female, 57% male.
Sample size	Unclear for students. N=19 participants stated at p46, but Ns for specific responses range up to N=23. For parents, N=8.
Intervention description	Programme for self-determination designed for young adults with autism, 'Putting Feet on My Dreams'. Ten sessions of 2-3 hours, each 6-9 participants. Staffing NR. The programme contains the following units: What is self-determination?; Life planning; Life knowledge; Communication; Learning; Organizing; Sharing of self-folios; and a module on experiences of autism specifically. The programme uses strategies specially adapted for students with autism, including visual organization of information and explicit teaching about social cues and situations. Strategies include

	didactic teaching, roleplays and video feedback, exercises, and discussion of students' experiences.
Data collection methods	Students were interviewed 8 weeks before beginning the programme, 1-2 weeks before, and 1-2 weeks after the end of the programme (10 weeks). Parents were interviewed 1-2 weeks before, 1-2 weeks after, and 8-10 weeks after. For students the interviews were conducted by a school autism specialist, using a structured interview instrument designed to elicit application of the concepts taught in the intervention programme. Visual stimuli were also used. In the final interview the questions were presented on a video which was paused to allow the student to respond. For parents a structured interview was done by phone (~1 hour). Parents were not informed of the programme content or activities, to determine whether students applied information learned in class.
Analysis methods	Student interviews were recorded and transcribed; parent interviews were coded from notes. Student interviews were analysed by speech-language therapists with specialist autism experience to minimise any difficulties as a result of students' communication impairments. Initially sections of transcript were randomised and blinded with respect to time (pre/post) and coders attempted to determine which came from the post interview. For parent interviews, data were analysed thematically, with a focus on points where changes in behaviour were observed or comments reflecting areas addressed by the intervention. Data were coded by two researchers independently and differences resolved by discussion.
Limitations identified by author	NR
Limitations identified by reviewer	Presentation of data is not entirely clear and the analysis appears to focus on positive changes produced by the intervention. Most of the data comes from the parent sample rather than from the students themselves.
Study funding	US Department of Education

Greher (2010)

Research question or focus	To describe the implementation of the SoundScape music intervention for young people with ASC [outcome data in Hillier (2012)]
Country of study	presume USA
Sampling methods and eligible population	Inclusion criteria: age 13-30; ASD diagnosis; no severe behavioural problems. No further information.
Recruitment methods	Flyers sent to professionals, adverts on website, presentations; participants were then recruited by a member of the psychology faculty involved in delivering the intervention.
% participation rate	NR
Sample demographics at baseline	Age 13-29, mean age 18; one Asian, others 'Caucasian' (note more information in linked Hillier paper).

Sample size	22
Intervention description	See data extraction of Hillier (2012) effectiveness study
Data collection methods	Open questions from feedback questionnaires completed by participants and parents at the end of the programme. Weekly diaries kept by teaching assistants.
Analysis methods	NR
Limitations identified by author	NR
Limitations identified by reviewer	Limited data reported. Mainly descriptive. Limited information on methods.
Study funding	NR

Jantz (2011)

Research question or focus	To explore perceptions and experiences of peer support groups for adults with Asperger's syndrome
Country of study	USA
Sampling methods and eligible population	People with Asperger's who either were in, were seeking, or had been in a peer support group
Recruitment methods	Posting in newsletter; flyer distributed by non-profit organisation serving people with Asperger's.
% participation rate	NR
Sample demographics at baseline	Majority between 40-60 years; 69% male; 91% at least some college education; all but one white
Sample size	35
Intervention description	Informal support groups for people with Asperger's. Five to seven group members. Groups led by professional facilitators qualified in social work or education (non-Asperger's). Content was unstructured with emphasis on participants sharing experiences.
Data collection methods	Interview (average 1 hour) either in person or by phone. Structured interview with open-ended and closed questions (data on closed questions not extracted here). Participants were sent interview guide in advance. Interviewer read back participants' statements during interview to confirm accuracy.
Analysis methods	Thematic analysis based on grounded theory. Themes were discussed by the author with a colleague and differences resolved by discussion.
Limitations identified by author	Possibly unrepresentative sample (high education, almost all white).
Limitations identified by reviewer	Limited qualitative data; main focus of report is on quantitative analysis of survey data
Study funding	None

MacLeod (2007)

Research question or focus	To report one person's experience of a support group for adults with Asperger's
Country of study	UK
Sampling methods and eligible population	NR
Recruitment methods	NR
% participation rate	NR
Sample demographics at baseline	Female; age 52 at time of joining group
Sample size	1
Intervention description	Support group for people aged >18 with Asperger's, focusing on general peer support and developing skills for communication and self-advocacy. Three coordinators and 10-15 group members; monthly sessions. Membership is closed, with explicit guidelines for attendance and behaviour. First part of session is 1.5 hour structured session where each participant shares recent experiences or problems, followed by more informal socialising. Co-ordinators plan and minute meetings.
Data collection methods	Open questions and answers given in written format. No further information.
Analysis methods	NR - implied that report presents a full transcript of the answers, but this is not clearly stated
Limitations identified by author	NR
Limitations identified by reviewer	Sample size of 1. Unclarity on data collection and analysis.
Study funding	NR

Marwick (2007)

Research question or focus	To conduct a process evaluation of the 'No. 6' one-stop shop service for adults with HFA/Asperger's in Edinburgh
Country of study	UK (Scotland)
Sampling methods and eligible population	For other organisations/professionals, stated that study sought "a representative sample of other agencies, organizations and professionals linked to Number 6, and included a university, a voluntary agency, an Adult Autism team, a parent group, and an employment support organisation", but unclear what 'representative' means here. NR for parents/service users or programme staff.
Recruitment methods	NR
% participation rate	NR

Sample demographics at baseline	No information on demographics or role. Other service providers represented "a university, a voluntary agency, an Adult Autism team, a parent group, and an employment support organisation". Referring professionals represented areas including "education, health, social work, parent group, service network, research, and the Scottish Executive" (although unclear if any qualitative data came from these groups).
Sample size	N=30 service users for questionnaire, N=12 interviews; N=14 parents/carers questionnaire, N=7 interviews; N=78 service evaluation comments; N=14 referring professionals; NR for other service providers. (Also unclear how many of these data sources informed the qualitative component of the research.)
Intervention description	Service aimed at adults ≥16 years with Asperger's or HFA in Lothian. Aimed to provide a network of support services, reduce isolation, address health needs in the widest sense, and prevent need for admission to specialist services. The centre provides direct support, provides referrals and signposting to other services, and a wide range of social activities. It also has links with an employment support service.
Data collection methods	Questionnaire instruments reproduced in report. No information on interview components.
Analysis methods	NR
Limitations identified by author	NR
Limitations identified by reviewer	Limited data and very little information on methods. Not clear that any divergent views were taken into account.
Study funding	Unclear, possibly by service provider ("NCAS was commissioned ... to carry out an evaluation" p4)

Ridout (2011)

Research question or focus	To evaluate the Warwickshire Adult Autism and Asperger Support Service, and in particular to assess whether it is appropriate to extend it to people aged 16-18.
Country of study	UK
Sampling methods and eligible population	Unclear. Study aimed to recruit both staff and service users in each of the adult service and the 16-18 pilot. For service users the study appears to have attempted to recruit everyone who had used the service; for staff NR.
Recruitment methods	Service users by post; staff NR
% participation rate	Assuming the figures given on pp42/45 are for the sampling frame rather than the sample (and including 16-18-year-olds, but these are a minority), 23% (21/92) for service users, 25% (23/92) for parent/carers
Sample demographics at baseline	NR
Sample size	Stated on p. x: 21 service users, 23 parent/carers, 14 professionals (but some service users were <18). On p. 42 it says the sample consisted of 85 adults and 7 young people, but this appears to

	mean the number of people who were contacted rather than the actual sample.
Intervention description	(Focus here is on the general adult service, rather than the 16-18 pilot, as the latter does not meet review criteria due to age of service users; majority of the data concerns the adult service.) Adult Autism and Asperger Service, staffed by 1 manager and 2 support workers. Service has supported ~80 people since 2009 (i.e. in ~1-2 years), with focus on: managing anxiety and depression; accessing the community; employment and benefits; and developing independent living skills (p xiii). Service focuses on higher-functioning people who would not otherwise receive support (i.e. not eligible on FACS criteria) and on preventing needs increasing to require social care or mental health specialist intervention (pp18-19).
Data collection methods	Semi-structured interviews with staff, first individual then group, with questions based on prior discussion and document analysis. Postal questionnaires and diaries for service users and parents/carers, and a 'photomontage' activity carried out with researcher individually.
Analysis methods	NR
Limitations identified by author	NR
Limitations identified by reviewer	Limited description of sample characteristics or study methods. Study authors appear close to intervention providers and analysis arguably lacks critical distance.
Study funding	Aiming High for Disabled People (p x)

Appendix 9: Aims and components of supportive services for adults with HFA

ID no.	Location	Organisation	Programme name (where applicable)	Population	Intention / aims	Ingredients/components
Autism Innovation fund projects						
1[48]	Leeds	Leeds Advocacy	Leeds Autism AIM (Advocacy, Information and Mentoring)	Asperger's / HFA	Provide **advocacy, information and mentoring** for autistic adults to enable them to better access mainstream services	○ **Mentoring** - trained volunteers who offer "support with issues such as access to services you want or need, employment issues, isolation and building confidence in your skills." ○ **Directory** of local autism services. ○ **Drop-in hub** with various facilities. ○ **Peer support** groups. ○ **Email and phone information** on accessing services. ○ **Advice and advocacy** provided in partnership with Citizen's Advice Bureau
2	Taunton	Taunton & District Citizens Advice Bureau	Enabling Autism	All on spectrum (formal diagnosis not required)	**Improve access** to advice and information services for people with autism and their families, and bridging the gap between specialist and mainstream services.	○ **Advice and advocacy** relating to services, housing, employment etc. ○ **Interagency working** ○ **Signposting** Identifying priority issues and concerns Increase awareness of specific needs of ASD in advice
3[85]	London	Asperger London Area Group (ALAG)	ALAG Peer Support	Asperger's	To train 6 **peer support brokers with Asperger syndrome** to help others plan the support they need and to provide advice and information.	○ **Peer support group** with regular meetings. ○ **Training** members to understand the social care system and give peer support to other individuals to enable them to engage more effectively with health services and tap into alternative autism resources
4	UK-wide	Living Autism	Living With Autism	Autism, not further specified	Produce practical information and strategies to address daily difficulties by people with autism, working through a consortium of local and national charity groups.	○ **Software application** for use by people with autism to help them reduce anxiety and confusion, organise their daily lives, reduce the need for recourse to inappropriate behaviours and thereby increase independence, whilst enabling progress to be monitored by carers and families, as required. ○ **Website** and **helpline** ○ Independent Advocacy to assist **transition from full-time education** ○ Space4Autism **practical workshops** on: •Relationships and sexuality, •Safety in the Community, •Challenging Behaviour. •Meltdowns and Closedowns. •"All about me" book ○ Member-led **leisure activities group**
5	Nottinghamshire	NORSACA = Autism East Midlands	Enterprise For Autism	Autism, not further specified	Pilot to support 7 adults with autism who do not meet the eligibility criteria for statutory support and help with vocational and independence skills.	○ Baseline **assessment of skills and aspirations** ○ **Volunteer placement** ○ **Support with CVs, job search, interviews** ○ **Work placement with buddy** **Improve social communication skills**
6[87]	Harrow	Asperger Syndrome Access to Provision	Good Food for the Soul	Asperger's	Not stated	○ Two 3 hour sessions per month for 10 clients per session over 6 months. ○ **Teaching basic nutrition, budgeting, menu planning** and the **effects of poor diet on health**.

ID no.	Location	Organisation	Programme name (where applicable)	Population	Intention / aims	Ingredients/components
7	N London	Black & Minority Ethnic Carers Support Service	Independence Support	Autism, not further specified	Deliver culturally appropriate, ethnically sensitive and flexible support to meet the needs of people with autism towards increasing life skills and being independent.	No information on individual components.
8	Stockport and Kingston	Balance	Connect Up	Asperger's	Create a hub whereby individuals with autism will be supported via a **3D virtual world** with the aim of reducing isolation and promoting emotional wellbeing.	○ **3D virtual world** ○ **Peer support** ○ **Mentoring** ○ **Advice and guidance from support workers** on employment, safety, communication ○ **Focal point for social interaction**
9	Kingston	Balance	Balance Asperger Team	Asperger's / HFA	Not stated	○ **Short training programmes** on personal development skills (communication, independence, relationships), preparation for work, safety ○ **One to one appointments for general support and advice** re benefits, housing etc.; social groups
10	Swindon	Joint project between Swindon LIFT and SEQOL Autism Diagnostic Team	LIFT project and autism team project	Autism spectrum including Asperger's	Widen **post-diagnostic support**, developing supportive tools and providing clear outcomes to local commissioners. Develop a pack that outlined an approach and materials to run a group for young women with Asperger Syndrome to develop their awareness of relationships and keeping safe and have it available for local organisations.	○ **Multidisciplinary team** to support people through the diagnostic process (core Speech Language Therapy and Psychology, with Occupational Therapy, Nursing and Social Work contributing as required) ○ **Information and signposting** to relevant support agencies ○ **Advice** on where to go next ○ **Directory of services** ○ **Groups supporting women with ASD in relationships**
11[49, 139]	Sheffield	Autism Plus	Autism Peer Advocacy	Autism	Support people with autism through a programme of **peer advocacy** to give them skills to support their peers.	○ **6 week course** covering topics such as: Identifying triggers, understanding own behaviour, working with peers, overcoming communication barriers, developing coping strategies, and supporting others. ○ **Facilitated peer networks**
12[90]	Worcs	Rainbow Autism CIC	The Spectrum Hub	Autism	**Social work led** support for **crisis prevention**	○ **Crisis prevention** ○ **Diagnosis/assessment** ○ **Benefit claims** support ○ **Employment support/voluntary placements** ○ **Skills workshops** ○ **Counselling/psychotherapy** ○ **Family support** ○ **Advocacy** ○ Support with **housing issues** and **money management/debts** ○ **Social groups** ○ Carers' group
13	Portsmouth	University of Portsmouth	Autism Centre for Employment	Formal diagnosis of high-functioning ASD	**Provide up to 40 adults with the confidence and employment skills** to access the job market and take part in a work placement scheme, changing employer attitudes	○ **Individual assessments and employment profile** (Designing a **tool to identify individual employment skills**) ○ **Recruiting autism-friendly employers** ○ **Work placement** ○ **Mentoring**

ID no.	Location	Organisation	Programme name (where applicable)	Population	Intention / aims	Ingredients/components
14*	South Glos	South Gloucestershire Council	Reaching Communities	?	Extending the reach of an existing advice and information service by taking it into the semi-rural community	○ **Mobile libraries raising awareness of ASD and including books on the topic** ○ **Signposting to services**
15	Nottinghamshire	Nottinghamshire County Council	Autism Training Works	Autism	Creating a **social enterprise** to enable people with autism to gain skills around training and presenting, creating employment opportunities and enabling autism awareness training to reach a wider audience.	○ **Social enterprise** ○ **Trained 6 Autism awareness trainers for public and private organisations** ○ **Teaching presentation skills and showing how to run a business**
16	E Sussex	East Sussex County Council	Spectrum Personal Development courses	Autism	Enable young people with autism to explore, discuss, prepare for and practice life skills.	○ A series of 12, 6-week **skill building programmes**
17	Lancs	Lancashire County Council	Autism Peer and Mentor Support Network	Autism	Development of a peer and mentor support network within central Lancashire and to be part of the wider Connect 4 Life Agenda.	○ **Peer and mentor support network**
18	Knowsley	Knowsley Metropolitan Borough Council	Knowlsey Autism Innovation Programme	Autism	Gaining and growing skills for independence, along with an **intensive music programme** for 6 people with the Liverpool Philharmonic Orchestra, with the opportunity to gain an arts award qualification. Also ran a support service to enable young people to eat out at a busy restaurant.	○ **Staff and volunteer assisted outings to restaurants on Friday evenings** ○ **10 week 1 to1 intensive interaction music sessions**
19	Surrey	Surrey County Council	Employment Works for Autism	HFA who are not eligible for other services	Focus on social skills and work experience for 16 people in a real workplace along with job coaching and support.	○ 2 day **employability training** course ○ 3 days/week **supported internship** ○ **One-to-one support** ○ **Job clubs**
20	Cambridgeshire	Red2Green	Celebrating Autism	Autism	30 young people will participate in creating the content for 10 **short information films** about autism and Asperger syndrome to improve awareness and help people get support.	○ Experience of parents ○ Needs and benefits of ASD in the workplace
21	Cambridgeshire	Red2Green	Aspirations	Asperger's / HFA	Help people cope in everyday situations & reduce isolation, anxiety & depression	○ **Individually tailored life skills training programme** (communication, relationships, self-understanding, healthy living, money management, living in the community, work readiness.)
22	National	Autism West Midlands	Connecting with Autism Community	Autism, not further specified	Updating and upgrading the existing **social network** for Autism Connect so it can provide more information and advice across England	○ **Social network** for people with autism and their families (https://autism-connect.org.uk). It aims to enable people to connect socially and to share information about autism-friendly locations and services.
23	National	National Autistic Society	NAS HelpTech	Students with autism, not further specified	To use **cloud based services to allow real time users and mentors to track and understand situations, issues and anxiety levels** for each day using smartphones and tablets.	○ **Cloud based services accessed via smartphones/tablets** ○ The traffic lights to monitor moods and anxiety levels, to have the reassurance that a Helpline responder available through service ○ Free text page being able to input areas of concern

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24	West Yorkshire	HFT	Luv2MeetU	ASC (and/or LD)	To set up a group to consider the factors that may encourage or deter people with autism to access Luv2meetU and Hum Tum. A review of up to 40 social and active based events that take place each month so that a good practice model is established to best help people with autism develop confidence in social situations.	○ **Friendship and dating agency**, mainly for people with LD but some info suggests also ASC without LD ○ **Arranged social events** (with individual support from volunteers) as well as dates.
25	Bury	Bury College	Understanding Autism	Autism, not further specified	To support young people with ASD (15-20) by providing a programme of activities to increase skills for independence	○ **Accredited training for staff** ○ **Tailored classes** for people with autism ○ **Awareness** work. ○ **Parent/student support network**
26	Manchester	Alice Darlington	Create and Smile	Autism not further specified (open to all)	Offer **creative session and business start-up advice** at easily accessible community centres in Greater Manchester on a rotating basis	○ **User-led** project providing **free art classes** for adults with autism and families/carers, aiming to boost confidence and provide scope for social interaction. **Support for selling** creations online ○ Sessions delivered by **professional tutors**
27	Hants, Berks, Oxfordshire	Circles South East	Early intervention	Autism, not further specified	Providing **training to professionals/families of individuals with autism who display sexually harmful behaviour**	○ **1-day training events** in addressing issues of sexual harm and sexually inappropriate behaviour. ○ A **telephone helpline** available for four hours per week .
28	Thames Valley, Hampshire, Kent, Surrey, Sussex	Circles South East	Adapted Circles	Autism (and/or LD)	Providing **training to professionals/families of individuals with autism who display sexually harmful behaviour**	○ **1-day training events** in addressing issues of sexual harm and sexually inappropriate behaviour. ○ A **telephone helpline** available for four hours per week
29	Somerset	National Autistic Society	Somerset Adult Autism Respite Service	Autism, not further specified	Provide an alternative **respite service** for adults with autism in Somerset, based around 2 yurts.	○ Provide overnight stays, weekend and week-long breaks for 12 people. ○ Landscape development projects for respite users
30	Derbyshire	Derbyshire Autism Services Group	Employment and Autism – Unlocking Untapped Potential	Autism, not further specified	Focus on **employers adapting their recruiting process/procedures** in order to make them more autism friendly.	○ **Raising awareness of ASD with employers** in the area ○ **CV writing support** ○ **Work placement** programme
31	Stockton-on-Tees	Daisy Chain Project	Increasing positive employment outcomes for young people with autism	Autism, not further specified	Providing a wide range of **employment opportunities and work experience and volunteering** for up to 30 people with autism in the charity's superstore.	○ **Social clubs** for 5 to 25 years old ○ **Work placement** within Daisy Chain's retail arm ○ 6 month course for entry Level 3 Award in **Employability Skills**
32	London	Caretrade Charitable Trust	Employment Opportunities	Autism, not further specified	To help 16 young people with autism gain paid employment or an apprenticeship.	Flexible mix of: ○ **Workshops** ○ **Job search sessions** ○ **Interview preparation** ○ **Work placements** ○ **Individual support** for people who have found a job

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33	London	Caretrade Charitable Trust		Autism, not further specified	Not stated	○ **Employment support project** involving full-time 36-week course in conjunction with Guys & St Thomas' NHS Foundation Trust ○ **Work experience 'tasters'** and supported employment initiatives
34	UK-wide	Specialisterne UK	Specialisterne work and well-being project	Autism, implicitly HFA	Providing **work opportunities, assessment and work experience** to lead to employment for up to 20 people.	○ No information on individual project components. ○ The organisation provides **assessment and training** for people with autism to understand their aptitudes and interests and map employment support needs. 40% of these are then hired by the organisation and employed as IT consultants for corporate clients.
35	Slough	Slough Borough Council	Slough Autism Connect / Travel Champions	Autism, not further specified	To support people with autism plan and undertake journeys	○ Volunteers undertake training to become **Travel Champions. These will deliver training to people with autism to use public transport safely and independently.** ○ **Training for public transport staff.**
36	Croydon	Croydon Council	Developing arts skills and related work experience opportunities for young people with autism.	Autism, not further specified	Support young people with autism to develop skills relevant to the arts industries.	○ **Work experience** ○ No information on individual components.
37	York	City of York Council	Focus on Autism - York	Autism, not further specified	Establishing an Autism Friends programme.	○ 2 hour **autism awareness course** ○ 2 day **autism champions course** to cascade autism awareness to their organisations and networks
38	Windsor	Borough of Windsor & Maidenhead	Autism Employment Challenge	Autism, not further specified	Securing 10 **employers as Autism Employment Champions** and 10 young people with autism securing **apprenticeships**.	○ **Autism Employment Champions** ○ **Apprenticeships** ○ No further information on individual components
39	Richmond	Borough of Richmond upon Thames	Interactive online learning and peer support community	Autism, not further specified	To enable people with autism to **gain skills and confidence to access employment opportunities**.	○ **3D virtual environment** ○ **1 to 1 training** in virtual environment ○ **Online training** programmes ○ **Peer support**
40	St Helens	St Helens Council	Supported employment service	Autism, not further specified	Providing **supported employment** to assist people with autism to secure work placements through **job coaching**.	○ **Application, CV and interview support** ○ **Training programme in self-esteem** ○ Successful candidates **mentor** those accessing service
41	London	South London and Maudsley NHS Foundation Trust	People with autism spectrum disorder in criminal justice and mental health systems in south London	Autism, not further specified	Aims to improve recognition of autism in the criminal justice system including developing guidelines.	No information on individual components.
42	Warwickshire	New Ideas Advocacy Project	College Without Walls	Autism	College without Walls was designed to deliver life resilience skills to adults and young people with autism in community setting.	○ **Courses** on helping people with autism to be **life resilient, keep safe** and **manage their own money**

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43	Lincoln	Linkage Community Trust	Linkage STAR Employability project	Adults with autism	Deliver an **employability support service** to help 12 adults with autism into work opportunities	○ **Interviews and assessment** ○ **Travel training** as appropriate on an individual basis ○ 6 half-day sessions over an 8-week period, delivered by two specialist Employment Services team members and one Adult Skills Job Coach ○ **Employer engagement and liaison** ○ **Supported work experience placements** ○ **In-work support for employers as well as clients** ○ **Information, advice and guidance** ○ **Weekly art and craft workshops** and **entrepreneurial** workshops to explore self-employment / freelance business options.
44	Dorset	Dorset Healthcare University NHS Foundation Trust	Pan Dorset Sensory Integration Therapy	Sensory Processing Disorder and autism	Increase the Trust's ability to recognise and treat all service users with Sensory Processing Disorder and autism	○ **Integrated care pathway** ○ **Sensory therapy room** ○ Increased provision of **Sensory Integration Therapy**
45†	Wetherby	Learning to Listen and Autism Angels	Autism Angels	Autistic spectrum	Increasing the reach of a service using horses as therapy	○ **Equine facilitated training model**: Personal development Building relationships Two way communication Boundaries How to deal with adversity Leadership and Teamwork
46	Telford and Wrekin	Telford and Wrekin Council for Voluntary Service	Fulfilling Futures, life after school	Young people with autism	Develop **transitional outreach service** with local partners, offering **targeted preventative social welfare support around life after school**	No information on individual components.
Advisory group list						
47	Hull	Matthew's Hub		HFA / Asperger's	**Support service** for people with high-functioning autism and Asperger's Syndrome	○ **1-1 advocacy** covering employment, housing, education, benefits, services ○ **Non-instructed advocacy** ○ **Liaison with employers** ○ **Social events**
48[1]	Leeds	Leeds AIM	Leeds Autism Hub	"adults on the autistic spectrum and carers who don't have access to much funded support"	Provide information, signposting and peer support	○ **Workshops** ○ **Peer support** ○ **Training** ○ **Advice** re employment, benefits etc.

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49[11, 139]	Yorkshire	Autism Plus	Multiple programmes	"autism, learning disabilities and mental health conditions"	Support adults and young people with autism, learning disabilities and mental health conditions	○ **Community support** - tailored support around e.g. travel, education, confidence, independent living ○ **First Routes employment support programme** - confidence and motivation, skill development, support in accessing college, interview support, workplace support. ○ **Fitness and leisure facilities** ○ **Social and creative activities** ○ **Health Champions** - volunteers who help individuals lead healthier lives ○ Several **social enterprises**
50	Sheffield	Sheffield Asperger Parents Action Group		Parents/carers /partners of adults/young people with HFA/Asp	Raise awareness of Asperger's Syndrome (AS) and Autism(ASD) in the community. Share experiences. Benefit from mutual support. Campaign for better facilities and services for people with AS.	○ **Social group and peer support** ○ **Liaison with services** ○ **Reference library** of books, articles and information on Asperger's Syndrome for members to use
51	Leicestershire	Leicestershire Autistic Society		Asperger's	Not stated	○ Two **social groups** for adults with Asperger's Syndrome
52	Leicestershire	Leicestershire County Council / NAS	Leicestershire Autism Information Hub helpline	Autism, not further specified	Not stated	○ Local **service directory** ○ Phone and email **helpline** ○ Information **drop-in service**
53	East Midlands	Autism East Midlands		ASC	Provide support to individuals with autism, either in the community or in their home environment	○ **Outreach services.** Enables people to take part in leisure activities, to gain daily living skills and in some cases to undertake supported employment.
54	Nottinghamshire	Nottinghamshire County Council	Asperger's social care team	Asperger's	Support adults with Asperger's Syndrome living in Nottinghamshire and their families and carers	Asperger's social care team provides: ○ **personal support** ○ **community care assessment** ○ **links with self-help groups**
55	Nottingham	Autistic Nottingham and East Midlands		ASC	Socialise and explore our divergent neurology together, as well as to offer a network of contacts and support.	○ **Self-help group** run by adults with ASC. Social group, information, general support, campaigning
56	Nottingham	Nottinghamshire Healthcare NHS FT		Asperger's	Not stated	○ Asperger's service provides "**diagnosis, treatment and signposting**" (needs referral from health professional / criminal justice professional). ○ Nurse run
57	Nottingham	Nottingham City Asperger Service (NCAS)		Asperger's	Provides a multidisciplinary assessment for adults with Asperger's Syndrome in addition to pre and post diagnostic support	○ **Multidisciplinary assessment** (needs referral from health professional). "The service works with individuals, their employers, partners, family and carers. " ○ Team includes: Clinical Psychologist, Psychiatrist, Speech and Language Therapist, Asperger Nurse Specialist, Asperger Liaison Nurse, Social Inclusion Worker, Occupational Therapist and Team Secretary
58	Northamptonshire	Northamptonshire NAS		ASC	Provide a service to adults with autism spectrum conditions (ASCs) and professionals and carers who support them	○ **Individualised support packages** which may include support with: goal-setting; safety; family and social relationships; accessing services and daily activities; living independently; skill development; employment support

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59	Bristol, Somerset, Gloucs	Avon and Wiltshire Mental Health Partnership NHS Trust	Autism friendly city	ASC	Create an autism friendly city	○ Assessment and diagnosis with **GP referral to key worker** for one-to-one support. Social support advice; advice on mental health (mindfulness, anxiety, social interaction); post-diagnostic support; ○ **Training for council staff** ○ **Project Search**, in which autistic people and people with a learning difficulty gain **work experience**. They are provided a **mentor** and spend 10 weeks at each of three different **placements**. ○ A project which supplies **job coaches** who ensure reasonable adjustments are made within the workplace and support autistic people to achieve their maximum potential. The job coaches are employed by the third sector and are jointly funded between Bristol City Council and the City of Bristol College.
60	Weston-s-Mare and N Somerset	BASS North Somerset		ASC	Monthly advice service for adults with autism spectrum conditions	○ **One-to-one advice** on: housing; education; employment; advocacy; carers support; managing emotions; information; signposting to other services
61	Dorset, Somerset, Hampshire, Wiltshire	Autism Wessex		ASC	Provide high quality specialist services for people affected by autism and associated difficulties across the counties of Dorset, Somerset, Hampshire and Wiltshire.	○ **Advice and information** ○ **Support with employment, education and other activities**; ○ **Advocacy** ○ **Drop-in social groups** for Asperger with various activities ○ **Personalised social care services**
62	Dorset	Dorset Adult Asperger Support (DAAS)		Asperger's	Provide support and information for adults with Asperger's Syndrome and their carers, families, friends and supporters in the Dorset area	○ Monthly **support/education meetings** ○ **Work with social services and NHS** to ensure involvement of Asperger's ○ **Information** ○ **Awareness**-raising
63	E Dorset	Community Adult Asperger Service (CAAS)		Asperger's	Provides diagnosis, specialist assessment, consultation and treatment for Adults with Asperger's Syndrome	○ **Diagnosis and assessment** (with referral from GP) ○ **Advice and signposting** ○ **Psychological assessments and therapies** ○ **Support and training for professionals**
64	Manchester	ASGMA Autistic Society Greater Manchester area	Aspirations	Asperger's / HFA	Help people with Asperger Syndrome to develop a 'tool kit' of life skills, particularly the social and communication skills that everyone needs	○ **Social groups** with various activities ○ **Living skills classes** ○ **Drop-in sessions** ○ **One-to-one support**
65	Manchester	ASGMA Autistic Society Greater Manchester area	Lifeskills project	ASC	Provide the confidence and skills that our members need to enjoy an independent life.	○ **Individualised one-to-one support** around independent living; accommodation; travel and accessing services; employment; education
66	Stockport	Stockport Metropolitan Borough Council / Stockport FLAG / Brothers of Charity		Asperger's / HFA	**Specialist advice and support** for people with a formal diagnosis of High Functioning Autism (HFA) or Asperger's Syndrome without any other identified disabilities.	○ **Assessment** ○ **Individual support** which may include advice on relationships, life skills, employment

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67	National	Pure Innovations		Autism / Asperger's	Support society's most vulnerable and disadvantaged people to live a more fulfilled, inclusive lifestyle	○ **Support around independent living and employment** ○ **Personalised support services**
68	Knowsley	Autism Support Group Knowsley		Autism, not further specified	An active and inclusive community group of disabled people, carers, older people and organisations in Knowsley.	○ **Parents' and carers' support group**
69[118]	Liverpool	Liverpool Asperger Team		Asperger's	Provide a specialist service for people with Asperger's Syndrome, adopting a person centred approach, using creative and innovative interventions to assist the individual with the social and communication barriers that they may face in everyday life	○ **Assessment and diagnosis** ○ **Information and advice** ○ **Clinical services** ○ **Referrals and liaison with other services** including criminal justice and mental health / substance use ○ **Drop-in social groups** run by people with Asperger's
70[119]	Sefton	Sefton Asperger Group		Asperger's	Provide support and diagnosis for those living with Asperger's Syndrome	○ **Assessment and diagnosis** ○ **Support with relationships; work; education; activities** ○ **Liaison with other services** ○ **Support for families and carers**
71	St Helens	St Helens Autism and Asperger Union		ASC / Asperger's	Social group for adults that meet up on a weekly basis. The group aims to help people make friends and have discussions around how to live independently and how to secure employment.	○ **Social group** ○ **Skills and training programmes**
72	National	Autism Initiatives		Autism, not further specified	Create unique services for people to enable them to have ownership of their own lives and future	○ **Outreach support** which may focus on: education; employment; leisure activities; life skills e.g. budgeting, cooking, healthy living, travel ○ **Support groups** ○ **Day centres** ○ All services based around **person-centred planning**
73	Wirral	Autism Together (fka Wirral Autistic Society)		ASC	Provide a wide range of living options, day services and community support to people with autism	○ **Resource centre** including: ○ **Arts and IT resources** ○ **Gym and outdoor activities** ○ **Social enterprise** and **volunteering programmes** ○ **Arts programme** ○ **Employment programme** offering opportunities for adults (with Asperger's?) who are not funded to purchase a service (includes **literacy and numeracy, life skills, and work placement**)
74	Portsmouth	Autism Hampshire / University of Portsmouth	Specialist mentoring	University students with Asperger's	Specialist mentoring support to students with Asperger's Syndrome that focuses on developing practical study skills & strategies that promotes positive achievement	○ **Specialist academic mentors** offering one-to-one support including work on study skills, social skills, motivation

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75	Hampshire	Autism Hampshire		Autism, not further specified	Deliver quality services designed tomeet the needs of families, young peopleand adults with autism	○ **Day centre** offering range of activities e.g. "Health & Wellbeing Awareness, Creative Arts, IT Skills, Woodwork, Music, Environmental Studies, Outward Bound Courses and Cooking Skills, Nutrition and Menu Planning" ○ **Individualised support with communication and life skills** ○ **Community services promoting social interaction, community inclusion and citizenship** ○ **Links with Community Access teams** (Southampton NHS, Portsmouth CC) who provide: **one-to-one support** by phone and in person; **information and drop in groups**; **post diagnosis support**; **signposting** to other services
76	Portsmouth / Basingstoke	Surrey and Borders Partnership NHS FT: Hampshire Autism service		ASC	Diagnostic pathway offers a single referral route for adults with autism	○ **Diagnosis and assessment (with referral)** ○ **Care plan** developed ○ **Post-diagnostic support and signposting** to other services
77	Oxford	Autism Oxford		Autism, not further specified	Information unavailable	○ **Support and training for people with ASC to speak about their experiences (and be paid for doing so) as part of the organisation's work in training / consultancy for professionals** ○ Also to "encourage and support the development of autism-specific services including opportunities for socialising, employment and realising personal potential",
78	Brighton & Hove	Assert Brighton & Hove		Asperger's / HFA	Support adults with Asperger's Syndrome or High Functioning Autism and their parents, partners or carers by providing advice, information, resources, education, social inclusion, volunteering opportunities and support to improve wellbeing and reduce isolation	○ **1-1 support and advice** ○ **Drop-in** ○ **Support group** ○ **Social events** ○ **Liaison with services** ○ **Life skills courses**
79	London	NAS	Acton day service	Autism incl. Asperger's	Provide accessible further education and training to enable learners to achieve their full potential and independence in an environment in which they feel supported, included and understood.	○ **Education** - vocational, life skills and leisure curriculum (with individual learning programmes); curriculum with full range of subjects including ICT, health and safety, horticulture, horse riding, sports, independent living skills, music, pottery, art and drama, numeracy, literacy and communication skills ○ Opportunities for **work experience**
80	London	NAS	Ladbroke Grove Autism Centre	Asperger's/HFA	Offer a safe and supportive environment in which children, young people and adults can meet other people, try new activities, explore interests and develop their confidence and independence.	○ **Life skills training** ○ **Group sessions on social/communication skills, vocational and leisure activities** ○ Opportunities to meet other people on autism spectrum ○ **Comprehensive support for daily living** ○ **Help with employment and training (Prospects) and higher education** ○ Evening **social groups**
81	Croydon	NAS	Croydon day services	Autism, not further specified	Give autistic adults a place to come for support, to socialise and to learn.	○ Various **courses** (numeracy, literacy, life skills, art and drama, IT, job skills, health and wellbeing) ○ **Leisure opportunities**

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82	Gravesend (Kent)	NAS	SAND support centre	Autism/Asperger's	Help people to develop communication and social skills, learn and prepare for work whilst emphasising enjoyment	○ **Communication skills groups** ○ **Help with work placement and college** ○ **Programmes for social and imagination skills** ○ **Leisure opportunities** ○ Programmes use SPELL and TEACCH
83	Gravesend (Kent)	NAS	Windmill centre	Autism, not further specified	Provide intensive one-to-one support to help people with complex needs to develop their life skills and communication techniques	○ Various **courses** (dance and drama, IT, communication, life skills, art) ○ **Leisure opportunities**
84	Godalming (Surrey)	NAS	Linden House	HFA	Service for high functioning adults with autism that provides educational, recreational and vocational training in a broadly college-type setting	○ **Day service offering courses** including life skills, cookery, IT, work-relevant skills ○ **Individualised support** e.g. for money management or employment support ○ **1-1 sessions with behaviour coordinator** to help deal with anxiety and improve quality of life
85[3]	London	Asperger London Area Group (ALAG)	Peer Support project	Asperger's	Train 6 **peer support brokers** with Asperger's syndrome to help others plan the support they need and to provide advice and information.	○ **Support group** with regular meetings and invited speakers on topics such as diagnosis, social skills, employment ○ **Training** from professional (Andrew Carpenter of the London Brokerage Network)
86	London	Centre for ADHD & Autism Support Harrow		Autism, not further specified	Support, educate and empower individuals with ADHD and/or autism, their families, and the community.	○ **Drop-in support** with emphasis on prevention and engaging families ○ **Family counselling** ○ **Youth transition project** ○ **Training for parents** ○ **Training with focus on empowerment and enabling clients to be a voice within the community** ("Empowering Ourselves to be Heard") ○ **Social opportunities** ○ **Book group** ○ **Creative writing group**
87[6]	Harrow	Asperger Syndrome Access to Provision		Asperger's/HFA	Two 3 hour sessions per month for 10 clients per session over 6 months teaching basic nutrition, budgeting, menu planning and the effects of poor diet on health.	○ **Weekly support sessions** and **social group** ○ **Advocacy**
88	Wokingham (Berkshire)	ASD Family Help		ASC	Offers **free support and advice** to individuals on the autistic spectrum, their parents, carers and professionals within Wokingham Borough, Berkshire UK	○ **Social activities** ○ **Life skills and customer service training** ○ **Employment support**
89	Worcester	Worcester ASPIE		Asperger's	Social self-help and motivation group for adults with Asperger's Syndrome	○ **Self-help group** run by adults with Asperger's ○ **Social and peer support group** ○ **Workshops** on social skills, anxiety and self-esteem ○ **Social activities**

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90[12]	Worcester	Rainbow Autism CIC		HFA	Social work led support for crisis prevention.	○ **Social groups** ○ **Advice** regarding benefits ○ **Diagnostic assessments** ○ **Counselling** ○ **Employment and education support** ○ **Information and signposting** ○ **Life skills training** ○ **Health and sports programmes**
91	Staffordshire	Lifeworks Staffordshire		Asperger's	Enable adults with High Functioning Autism (HFA) and Asperger's Syndrome (AS) to gain employment	○ **Employment support** and **mentoring** ○ **Liaison with employers**
92	Staffordshire	Staffordshire Adults Autistic Society		ASC	Not stated	○ **Work experience** ○ **Training** ○ **Planned social group**
93	West Midlands	Autism West Midlands		ASC	Enrich the lives of people with autism and those who love and care for them.	○ **Outreach support** ○ **Employment support and mentoring** including **liaison with employers** and support with social interaction and other issues ○ **Student support** ○ **Personalised advice and support** ○ **Social groups and activities** ○ **Befriending service**
94	Shropshire	Shropshire Autism Hub		ASC incl. Asperger's	Provide services and activities that encourage people to develop, learn and progress in a safe, fun environment that supports expression in an autism friendly way	○ **Weekly drop-in** ○ **Peer support** ○ **Carer support** ○ **Advice** on benefits, housing, relationships, money, employment ○ **Social activities** ○ **Life skills workshops** ○ **Signposting** to other services ○ **Drama group**
95	Shropshire	Autonomy		Asperger's/HFA	Shropshire and Telford based self-help and social group for young people and adults who have Asperger syndrome (AS) or high ability autism (HFASD), (diagnosed or undiagnosed)	○ **Social events** ○ **Support with diagnosis and post-diagnosis** ○ **Support with benefits**
96	Shropshire, Telford & Wrekin	STACS - Shropshire & Telford Asperger Carers Support		Carers of people with Asperger's	Provide support, information and a higher level of knowledge and understanding to parents, carers and partners of adults (16+) on the autistic spectrum. STACS also aims to help improve the lives of those on the Autistic Spectrum and their carers, by campaigning for better services and provision, awareness-raising and by other means.	○ **Workshops** with invited speakers on various topics ○ **Social and respite outings for carers**

ID no.	Location	Organisation	Programme name (where applicable)	Population	Intention / aims	Ingredients/components
97	Sunderland	Autism in Mind		Autism, not further specified	Support anyone who is living with autism in Sunderland	○ **Group run by adults with ASC** ○ **Regular meetings** for adults with Asp/HFA ○ **Advocacy** for parents, carers and adults with autism - including **benefits assessments** and reassessments
98	Cornwall	Debi Evans	Meltdown Mentors	ASC	Consultancy and training service specialising in 'meltdowns' and 'shutdowns' associated with Autism Spectrum Conditions (ASC) and Attention Deficit Hyperactivity Disorder (ADHD).	○ **Personal help and support on avoiding 'meltdowns'**
Autism Self Assessment Local Good Practice supplement						
99	Nottingham			Asperger's	Provide autism awareness and training	○ **Training materials** (DVD and booklet) developed by Consultant Clinical Psychologist (Asperger Service) and Speech and Language therapist
100	Hertfordshire			Asperger's	Provide Asperger's social care team for adults with no learning disability	○ **Work trials** for people living with autism ○ Ensure **works solutions team** are aware and have the skills to work with people living with autism. **Training** across a section of staff has taken place over a number of years to ensure basic awareness and other specific skills . ○ Provider offering **bespoke services** for people with autism, matching people to people in way that has meant people are **living in the community with a staff team built around them**
101	Norfolk	Norfolk County Council		Asperger's	Partnership with health commissioners (CCGs) to provide an Asperger **diagnostic and support service**	No information on components
102	Enfield				Specialist carers' resource to provide a weekly drop in session for people with autism and their parent / carers	○ **Weekly drop in session** for people with autism and their parent / carers. ○ **Promotion and awareness campaign** to improve identification of people with autism and better **co-ordination of information** to improve planning and commissioning processes.
103	Islington		Our Fulfilling Lives Partnership Board	HFA	Oversee the improvements needed for those with higher functioning autism	○ **Working collaboratively** with Children's Services, Camden commissioners, the Asperger London Area Group (ALAG) and a range of internal and external partners such as Job Centre Plus **to implement work plan priorities** ○ **Autism specific webpage** on the Islington Council website ○ **Online e-learning resources** for **housing and social care staff** ○ **Job Centre Plus training** their local teams ○ **Criminal Justice commissioned report** highlighting the work required for offenders with learning disabilities and/or autism ○ Actively supported **ALAG peer support brokerage service**; two Islington residents are gaining valuable experience that can be shared with others ○ Plans to place greater emphasis on **befriending, mentoring, social skills development and 'skills for life' training** programmes. ○ Exploring **autism specific social work resource** to assist in this as well as **signposting** people to additional support. ○ A **wider training programme for front line** staff across criminal justice, health, housing and social care is being prioritised over the coming year

ID no.	Location	Organisation	Programme name (where applicable)	Population	Intention / aims	Ingredients/components
104	Tower Hamlets			Autism / HFA	Support health and wellbeing	○ Proposed **men's group** that looks at areas of health and wellbeing. The plan would be to have a rolling package of about 8 topics; this will include **health eating, safety in the home, sexual health and coping with sensory difficulties**. The group will aim to provide useful information in relation to the topics and promote discussion. Further group ideas will be explored. ○ Proposed **drop-in service** for issues around housing and benefits to be run by social worker. ○ Referral of service users to from Autism Diagnostic & Intervention team to the Osmani centre (run by public health). Thus far we have provided them with clear guidance e.g. what **fitness activities** would be suitable for this service user group (gym sessions would be preferred to organised sports groups). ○ The centre also runs groups on **healthy eating and cooking**. The local Osmani centre wish to devise **a group for people with High functioning Autism**, it has been suggested that the centre health trainers would conduct the first 5 sessions (on food healthy groups), with the team occupational therapist co-facilitating a 6th session which will be a cooking session. This will provide the service users with education around healthy eating to promote physical health and wellbeing this also enable the occupational therapist to assess social skills and conduct and Activities of daily living assessment.
105	Salford			ASC / Asperger's	Focus on the ASC and Asperger's population. People with a LD are well supported so the priority for development is people without a LD but on the Spectrum	No information on components
106	Sefton			Autism / Asperger's	Develop community awareness. Develop universal settings to be autism friendly. Improve data collection. Provide joined up advice and information services.	○ An **identified autism lead** ○ In the process of identifying a **person with autism/Asperger's to be a champion for Think Autism**. ○ **Working with providers, self-advocates and carers** to develop community awareness and will be utilising the **capital grant for a partnership project** to support people with autism and their families. ○ Continue to develop Universal settings (e.g. such as **leisure centres**) to be autism friendly (**Sport England bid**) ○ **Improve data collection** and across health and social care ○ Autism is a **training priority** for mainstream and specialist health and social care, Police, Probation, Housing and Job Centres. ○ Joined up advice and information services through **website** and intend the **capital fund project** to make it easier for people to find information.

ID no.	Location	Organisation	Programme name (where applicable)	Population	Intention / aims	Ingredients/components
107	Oxfordshire		ASPiration	Asperger's /HFA	The ASPiration Service is a support service for Over 16s with Asperger Syndrome and High Functioning Autism living in Oxfordshire. The service is a lower level preventative service delivered by Kingwood and offers practical short-term support. The aim is to help people to reach their full potential, by developing skills, independence and confidence.	○ Advice, information and guidance on a range of issues. **Helping people access other organisations and services.** They hold **drop-in sessions** on a Monday from 2pm-4pm and on Thursday from 5.30pm-7.30pm. ○ Support: specifically tailored to people's needs. **One-to-one support sessions** to help people take steps towards achieving their goal. **Practical support** on a range of topics such as **housing, benefits, education and courses, employment, relationships etc.** ○ **Peer groups**: run by the service such as film and social groups. Plus some **support workshops** on various topics such as benefits workshop ○ Support is offered via **individual face-to-face support, telephone, email, app technology and in group sessions** ○ The emphasis is on empowering individuals to achieve their goals. **Coaching and mentoring techniques based on the principles of positive psychology** are used. Individuals are encouraged to use their strengths to improve skills and help them independently problem-solve. Although the support intervention is short-term the aim is to give people life-long skills to maintain their independence and ability to overcome barriers.
108	Calderdale			Autism / Asperger's	Supporting a small group of adults with Autism/Asperger's to set up a **User Led Organisation to provide autism awareness training**.	No information on components
109	Nottinghamshire	Nottinghamshire CC & Nottinghamshire NHS Trust	NHS Flo Simple Telehealth pilot scheme	Asperger's	To enable individuals with Asperger's to independently undertake their daily routines.	○ **Daily or weekly text message reminders** were sent to service users with Asperger's to provide **prompts t**o enable the individual to independently undertake their daily routines. This proved very successful and the Team won a Nottinghamshire NHS award for 'The most creative use of Assistive Technology 2014'. Initially the FLO messages focused on providing mealtime prompts and would **alert a carer if no response was made by the service user within 3 days** therefore providing a back-up system using existing informal support network. As the text messages are worded in a way that asks if an individual has undertaken a task it enables them to respond with a yes or no which can then be easily monitored by FLO lead to analyse the effectiveness and reminder prompts can be sent at an agreed time for none or negative responses. The scheme was then widened to enable prompts with all aspects of daily routines. ○ FLO will now be **offered to all individuals with Asperger's who are referred to the Team as a matter of routine.**
110	Hertfordshire		Asperger's Social Care team		Team that works specifically with people with Asperger's and Autism who do not have a learning disability.	○ **Expert by Experience** on the team who provides post diagnosis support and information, signposting, prevention, short term intervention, and community links. ○ The team **work closely with mental health services, Criminal Justice, Substance Misuse** to ensure people access the right support. ○ We work in partnership with a wide range of providers to develop specific services. We have received 150 new **referrals via GP's, families, self-referrals and other professionals** and have transferred 148 additional **cases from the local Mental Health teams and Community Learning Disability Teams**.

ID no.	Location	Organisation	Programme name (where applicable)	Population	Intention / aims	Ingredients/components
111	Thurrock		Spectrum	Asperger's	Support group/activity group supported by a Community Interest Company (Thurrock Lifestyle Solutions) meets regularly and will act as a sounding board for some aspects of the Thurrock Autism Strategy action plan.	○ **Support/activity group**
112‡	Barnet	Barnet council / local housing association		Asperger's / HFA	Increasing the amount of independent housing and support available for people with autism to assist clients receiving residential or other services who wish to live independently and need a pathway to independence.	○ Worked with a housing association to develop a s**upported housing scheme of 10 self-contained studio flats for people with high-functioning autism-Asperger's**. ○ As a former sheltered housing scheme the housing association was able to fund refurbishment and wherever possible design the scheme to **meet the sensory and other needs of people with autism**. ○ The housing association provides **housing related 'fixed support'** to its tenants for 10 hours per tenant per week. Where tenants require more hours of support, they can purchase **additional support through their direct payment** and choose a provider of their choice. The service is aimed to help people gain the skills to live independently. Therefore it is expected once these skills are in place that **tenants will be referred to move on to flats of their own**.
113	Camden	Camden & Islington Foundation Trust (CIFT)		Asperger's / HFA	Service for the diagnosis of high functioning autism / Asperger's syndrome and the treatment of ADHD.	○ **Full diagnostic assessment** based on the NICE adult autism guidance are provided, gathering a detailed background history from the Autism Diagnostic Interview, Informant interview ((3Di) , Autism Diagnostic Observation Schedule (ADOS), Mental State Examination, and a Cognitive Assessment if needed. ○ Once diagnosed the service user is seen by the **ASC Care Coordinator**. They will also be provided with advice, psycho-education and signposting. There is in use a **care pathway for signposting for care and support** on to voluntary sector organisations, including Autism London and the National Autistic Society. ○ **Assessment of mental health needs** and **referral** on to appropriate existing mental health services. ○ In a proportion of complex cases there is capacity for the service to provide **psychological interventions** including one-to-one therapy and group interventions. The staff include sessional use of a consultant psychiatrist and psychologists.
114	Croydon	Council, local service provider, and local voluntary organisation		ASD	Improved support for carers (including information, advice, news of events and face to face meetings). Increase opportunities for "self-help"; support can be accessed from others who have had similar experiences and thereby increasing the potential for crisis resolution.	○ **Peer support group for carers and parents of people with ASD**. Monthly meetings encompassing all age groups (of people on the spectrum) as well as diagnosis (Autism to Asperger's). The group have also established their own **social media site (Facebook)** in order to share information and news about services and events. The peer support group is also linked to Croydon Carers Centre thereby enabling clear **signposting** for enquirers. ○ The newly established group is supported by the council's **Autism Champion** and Deputy Cabinet Member for Health and Social Care.
115	Hammersmith and Fulham; Kensington and Chelsea; Westminster	ASSIST		Asperger's	Provide **pre and post diagnostic personalised support** to people with Asperger syndrome	○ **Working with local health providers** to build links and promote the support they offer for people at a range of community access points, e.g. Job Centre Plus, General Practitioners

ID no.	Location	Organisation	Programme name (where applicable)	Population	Intention / aims	Ingredients/components
116	Redbridge		Redbridge First Response Service (ReFRS)	Undiagnosed autism or not FACS eligible	Coordinate access to preventative advice, information and support provided by 48 partners from the statutory/voluntary sector. The service supports people to maintain their health, wellbeing, safety and security for as long as possible.	○ ReFRS acts as **pathway** for those adults that may be undiagnosed with autism or not FACS eligible, or for parents who have a child with autism to access social care/ community support. There are also pathways to organisations such as STAAR (Supporting Those with Autism & Asperger's in Redbridge), Informed Families and the Sycamore Trust that provide specialist support for adults/ families and their carers with autism. ○ ReFRS provides **holistic support through a single point of access**. A **checklist** identifies areas of support under the headings of health and well-being, Income, finance, safety to cover all aspects of a person's wellbeing. ReFRS makes a **referral** on behalf of the service user to the organisation of their choice, **follows up** the referral and **ensures the necessary information / support is provided by the organisation before closing a case**.
117	Blackpool			Asperger's / HFA	Provide support for adults who would otherwise be socially isolated.	○ A **local mental health practitioner who specialises in autism, primarily Asperger Syndrome and High Functioning Autism**. ○ The practitioner runs **two peer support groups**, one for **adults and carers** and the other for **young adults**.
118[69]	Liverpool	Liverpool City Council / Liverpool CCG	Specialist Asperger's Team	Asperger's	Not stated	No information on components
119[70]	Sefton	Sefton CCGs / Mersey Care NHS Trust	Sefton Asperger Service	Asperger's	Provide diagnostic assessments and support following diagnosis if this is needed	No information on components
120	East Sussex		Community Links (http://www.southdownhousing.org/community-support/community-links-east-sussex)	Adults with mental health needs and/or autism	Providing support to people with autism who do not meet the criteria for support from ASC	○ **Individually tailored support** for people with mental health needs and/or Autism to engage and participate within their community. Their **Advisors** provide support to explore and access a variety of mainstream activities including: **Employment/Volunteering, Education/Training, Faith/Spirituality, Arts/Culture, Health/Leisure, Special interests** ○ They do this by providing **one-to-one** support to: · **Identify and achieve goals** according to individual aspirations · **Develop existing and new skills** in line with personal interests · **Participate in and sustain mainstream activities** in the local community · **Create links with a full range of agencies and groups** within the community

ID no.	Location	Organisation	Programme name (where applicable)	Population	Intention / aims	Ingredients/components
121	Oxfordshire			Asperger Syndrome / HFA	Deliver and coordinate **FACs assessments** for people with autism	○ Oxfordshire recognised the need for a **specialist social worker post** to help deliver and coordinate FACs assessments for people diagnosed with autism. ○ People are supported to request a Fair Access to Care Services assessment, by contacting the Oxfordshire Senior Practitioner for Asperger Syndrome and High Functioning Autism. The person will then be allocated to a team that best fits their needs, such as a mental health or social care team, who will undertake the FACS assessment. The social worker supports the client and the designated social worker to **ensure the person's needs are met and has implemented a pathway into social care which is seamless**. ○ **One-to-one support is provided for people awaiting a FACS assessment and whilst the assessment is carried out**. ○ **For people who are assessed as non-FACS eligible support from Aspiration service may continue.** Individuals who undergo a FACS assessment and are eligible to receive funding, are supported to choose and access on-going long-term support via Autism support providers.
122	Windsor and Maidenhead		Ways into Work service	Autism / Asperger's Syndrome	Provide **employment support** for people with autism	○ **Autism Specialists** identified over 50 people (two thirds of the caseload) as having an employment need, particularly among those with Asperger's Syndrome who do not usually meet social care Fair Access to Care Services (FACS) criteria. ○ The **ways into work service** is now supporting 36 individuals with asc and has supported 20 individuals to access employment including **apprenticeships**
123	Wokingham	Wokingham Borough Council / ASD Family Help		People with autism **who do not meet the criteria to access Social Care**	To reduce the number of people with Autism reaching a 'critical need' status	○ **Information**, ○ **Advice** ○ **Signposting** ○ **General guidance** and **peer support** ○ Weekly **support groups** as **social activities/events**
124	Dorset / Bournemouth	Dorset CCG / Pan-Dorset ASC Partnership Board	Community Adult Asperger's Service	Asperger's	Not stated	No information on components
125	Worcestershire			Autism / Asperger's Syndrome	A new dedicated service for people with Autism Spectrum Conditions/Asperger's has been developed and is currently being commissioned. The service will provide support, assessment and diagnostic services for adults to ensure the right support is available in a targeted, cost effective and high quality way, whilst also satisfying the NHS and Council's requirements based on the National Autism Strategy and Think Autism 2014 and clinical evidence for assessment and diagnoses and best practise for support.	No information on components

ID no.	Location	Organisation	Programme name (where applicable)	Population	Intention / aims	Ingredients/components
126	Doncaster		Autism Spectrum Information Centre	ASD/Asperger's syndrome but do not meet the FACS criteria	Help and support those adults who have been diagnosed with ASD/Asperger's syndrome but do not meet the FACS criteria for future mainstream support	○ **Well Being officer** in post whose role is to engage with the service users with a view of moving them forward in their lives. ○ **Regular outreach sessions** on a weekly basis are held at the centre in the following areas: **Benefits, housing employment and education/ training**. ○ The **art therapy sessions** are in place as well which have been particularly very helpful in alleviating stress levels amongst the service users. ○ The service users are also offered **budgeting skills**, independent travel training at the centre. ○ These sessions have culminated into friendships and **peer support befriending group** and a **social group** (Altogether 4 Autism) independently run by the group of trustees who are the carers themselves.
127	Derby			Asperger's	Not stated	○ A local **self-help group for Adults with Asperger's**
128	Derbyshire			Autism	Not stated	○ **Separating Autism from generic Learning Disability Commissioning** and co-ordination ○ **Autism Co-ordination group** to support effective planning and development. ○ **Awareness raising** ○ **Training and employment support service**
129	Nottingham		Autism Partnership Board (SPLAT - Speak, Listen Act Together, which also incorporates LD)	Autism	Empowers and enables autistic people and carers to hold public services to account. Nottingham City's Autism Strategy "One Size Fits One" and Implementation Plan will be scrutinised by this group.	No information on components
130	Camden			People diagnosed with Asperger's or high functioning autism without learning disabilities	Help improve everyday communication within work and social situations	○ Speech and language therapy provides psychosocial intervention through **communication skills groups**. These are run 3 times a year. The groups run for 6 weeks for 1.25 hours. Group size is on average 8 -10, the logistics for people to attend and their anxieties limit the group to smaller numbers. There is a great deal of preparation for the Speech Language Therapists prior to the group from **individual screening appointments** to preparation of materials for the groups and **telephone liaison with referrers and clients**. ○ The group focuses on **social learning tasks** for **everyday communication within work and social situations** as per the NICE autism guidance which improves social interaction and typically includes: · **modelling** · **peer feedback** · **discussion and decision making** · **explicit rules** · **suggested strategies for dealing with socially difficult situations** from Speech Language Therapists and group members. ○ An **individually delivered social learning programme** is provided **for people who find group-based activities difficult.**

ID no.	Location	Organisation	Programme name (where applicable)	Population	Intention / aims	Ingredients/components
131	Ealing	Ealing Council and CCG	ASSIST (Asperger Support, Signposting, and Information Services Team)	People with Asperger's who aren't eligible for social care	Provide bespoke and flexible support to individuals with Asperger's and their families	○ **Ability to hold meetings in different venues** (e.g. home visits, a library, coffee shop, park, or the autism centre) ○ **Flexibility and choice** in how users receive support e.g. Skype, text, email, twitter, face to face appointments, workshops or social activities ○ Provides **person-centred support** in a wide variety of ways, such as developing **social skills, improving wellbeing, building confidence and self-advocacy skills, helping to complete forms, CV writing, interview techniques, budgeting** etc. ○ The service also provides an opportunity for **parents and siblings of adults** to talk to someone and receive support and advice
132	Haringey	Haringey Council	Housing Need Identification Pilot	High functioning Autism not picked up by mainstream Adult Social Care	Identify the number of people who present with an (high functioning) Autism that are not picked up by mainstream Adult Social Care because they either fall outside the FACTs Criteria or have not been assessed for an Autism.	○ Commissioned 10 **providers of housing related support** to take part in a pilot **to identify people who are potentially autistic who use their services**. The purpose is to get some good data about autistic people using mainstream services which will be used to inform future commissioning. ○ Providers were asked to complete an **assessment tool** ○ **Housing Related Support Training** was provided to each organisation by a Consultant Psychiatrist, this included background, triad of impairment, autistic traits and how to use the screening tools to identify people who may have an autism spectrum disorder. ○ The screening is voluntary and organisations have been given a choice of screening tools to use. ○ Those who reach the threshold will be invited to undertake a full autism **diagnosis** and will also be **signposted to the autism hubs**.
133	Lewisham		Information, Support and Advice Service for Adults with Autism/Asperger Syndrome	Autism / Asperger's	Help people with autism gain employment, improve their understanding of the condition, develop living skills	○ Local **Information, Support and Advice Service for Adults with Autism/Asperger Syndrome** has been very successful especially for people with Autism who are not FACS (Fair Access to Care) eligible and their carers. Support from the service has helped some autistic people to gain employment which would otherwise seem impossible for them. Providing some **support to their employers** has also been immensely helpful. The service has also helped both autistic people and their carers to **develop an improved understanding of the condition** and this has helped them to socialise with their peers and other population groups. The result is that a lot of them feel less/no longer lonely or depressed. The service has also been successful because the **living skills they are acquiring from the service via training** is helping them to be increasingly more independent and carers are getting more time for themselves compared to when they were not accessing the service.

ID no.	Location	Organisation	Programme name (where applicable)	Population	Intention / aims	Ingredients/components
134	Newham		Newham Asperger's/High Functioning Autism Service	Asperger's/High Functioning Autism	Deliver health and social care interventions within an integrated service	○ Newham Asperger's/High Functioning Autism Service located in Adult Mental Health Services, delivering health and social care interventions within an integrated service is the most successful and helpful. Summary of groups and activities: · our **Asperger's specialist** has a **pub group** once a month in Central London (run by other people with ASD on the 4th Tuesday of the month; · There is a **day outing** every month led by Asperger's specialist; · There is a **cinema group** once a month (on the 3rd Thursday of the month at 12:30 in Stratford Picture House); · Asperger's specialist also organises **one-off events/activities**, such as our '**Expert Afternoons**' where the service users can volunteer to tell the rest of the group about their special interest; · Asperger's specialist also has an **email list** where she sends out other information that may be of interest to all people in the group, such as activities organised by other agencies; · Asperger's specialist and the group go to the **All Party Parliamentary Group on Autism** (about 3 times a year); · Our Asperger's specialist has got together with the **Community Neighbourhood link officer** and have **worked with people with autism to develop new activities** for people with autism e.g. **Board Games group** now takes place every fourth Thursday of the month · There is an **Autism Support and Awareness session** once a month organised at St Mark's Centre every 3rd Wednesday of month, These activities are run so people can air their views directly and feel like they have more control/input into services. An independent organisation; The Forum for Health and Wellbeing helps to facilitate this group.
135	Brighton and Hove		Open Arts / Art & Identity	Asperger Syndrome and High Functioning Autism	Provide therapeutic support and social enterprise opportunities. / Facilitate a therapeutic art course	There were two successful Autism Fund projects: ○ The **"Open Arts" project** will provide **therapeutic support and social enterprise opportunities** to adults with Asperger's, Autism and Learning Disabilities through **Visual and Live Arts courses** at the Open Market in Brighton. ○ The '**Art & Identity**' project will facilitate a **therapeutic art course** for adults with Asperger Syndrome (AS) and High Functioning Autism (HFA) for adults aged 16 and over who are resident in Brighton and Hove and are **struggling to access social and support services**.
136	Plymouth	MIND	Recovery College courses	Asperger's	Not stated	○ **Social communication and interaction courses for people with Asperger's** who are members of the local Plymouth support group.
137	Swindon	Independent user-led	Swindon Advocacy Movement	High functioning autism	Provide a specialist advocacy service which supports those with to autism to understand their condition better; communicate needs and wishes to family members, carers and professionals; access the Adult Autism Diagnostic Service; and access other services for advocacy and support.	○ Swindon Advocacy Movement is a **user led independent advocacy service** for people with a learning disability and High Functioning Autism and Asperger's in Swindon.

ID no.	Location	Organisation	Programme name (where applicable)	Population	Intention / aims	Ingredients/components
138	Calderdale			Asperger's Syndrome	Not stated	○ Asperger's **Peer Support Groups** - 3 groups which meet monthly ○ **Partner support group** ○ **Support for parents**
139[11, 49]	Kirklees	Autism Plus		Autism / Asperger's Syndrome	Not stated	○ **Friendship and support group** for adults with autism / Asperger's

* "Reaching Communities" is a general stream of Lottery funding, not an autism specific project
† Focus appears to be on children with autism
‡ Not low-level support, but specific to HFA/AS and retained for completeness
Superscript numbers[x] in the ID no. column identify likely duplicate entries identified from a different data source

Appendix 10: Cross tabulation of services and components identified from service mapping exercise

ID no.	Location	Organisation	Programme name (where applicable)	Teaching/ training service users	Employment support	Individualised / one-to-one support	Information resources/ signposting	Peer support	Social /creative events and activities	Advice and guidance	Other support/activity groups	Advocacy / liaison	Teaching/training professionals/public/famil	Needs assessment / post-diagnostic support	Drop-in / hubs	Health professional involvement	Mentoring	Family/carer support	Telephone/email/online support	Collaboration and coordination with other	Social enterprise	Assistive technology (mobile apps/cloud based	Outreach services	Social media	Other	No details / not adults / not low-level	Total no. of reported components
Count				48	32	32	25	24	24	23	23	21	20	19	15	12	11	10	9	8	6	6	5	3	13	7	
12	Worcestershire	Rainbow Autism CIC	The Spectrum Hub	●	●	●	●	●		●	●	●		●	●	●		●		●							13
107	Oxfordshire	Kingwood	ASPiration			●	●	●		●		●			●		●		●			●					9
75	Hampshire	Autism Hampshire		●		●	●		●			●		●	●				●								8
1	Leeds	Leeds Advocacy	Leeds Autism AIM				●	●		●		●			●		●		●								7
61	Dorset, Somerset, Hampshire, Wiltshire	Autism Wessex			●	●	●		●	●		●			●												7
78	Brighton & Hove	Assert Brighton & Hove		●		●		●	●	●		●			●												7
93	West Midlands	Autism West Midlands			●	●			●	●		●					●						●				7
94	Shropshire	Shropshire Autism Hub		●			●	●	●	●					●			●									7
103	Islington		Our Fulfilling Lives Partnership Board	●	●			●					●				●		●	●							7
8	Stockport and Kingston	Balance	Connect Up					●		●							●					●		●	●		6
59	Bristol, Somerset, Gloucs	Avon and Wiltshire Mental Health Partnership NHS Trust	Autism friendly city		●	●				●			●	●			●										6
69	Liverpool	Liverpool Asperger Team				●	●			●				●	●	●											6

ID no.	Location	Organisation	Programme name (where applicable)	Teaching/ training service users	Employment support	Individualised / one-to-one support	Information resources/ signposting	Peer support	Social /creative events and activities	Advice and guidance	Other support/activity groups	Advocacy / liaison	Teaching/training professionals/public/famil	Needs assessment / post-diagnostic support	Drop-in / hubs	Health professional involvement	Mentoring	Family/carer support	Telephone/email/online support	Collaboration and coordination with other	Social enterprise	Assistive technology (mobile apps/cloud based	Outreach services	Social media	Other	No details / not adults / not low-level	Total no. of reported components
86	London	Centre for ADHD & Autism Support Harrow		●					●		●		●		●			●									6
104	Tower Hamlets			●			●		●		●				●										●		6
116	Redbridge		Redbridge First Response Service (ReFRS)			●	●			●		●									●					●		6
4	UK-wide	Living Autism	Living With Autism	●							●	●							●			●						5
63	E Dorset	Community Adult Asperger Service (CAAS)					●			●			●	●		●											5
73	Wirral	Autism Together (fka Wirral Autistic Society)		●	●				●						●						●						5
106	Sefton						●			●			●						●						●		5
110	Hertfordshire		Asperger's Social Care team				●			●				●		●				●							5
123	Wokingham	Wokingham Borough Council / ASD Family Help					●	●	●	●	●																5
126	Doncaster		Autism Spectrum Information Centre	●				●	●		●													●			5
2	Taunton	Taunton & District Citizens Advice Bureau	Enabling Autism			●	●			●		●								●							5
43	Lincoln	Linkage Community Trust	Linkage STAR Employability project		●	●			●			●	●														5
39	Richmond	Borough of Richmond upon Thames	Interactive online learning and peer support community	●	●	●		●														●					5

ID no.	Location	Organisation	Programme name (where applicable)	Teaching/ training service users	Employment support	Individualised / one-to-one support	Information resources/ signposting	Peer support	Social /creative events and activities	Advice and guidance	Other support/activity groups	Advocacy / liaison	Teaching/training professionals/public/famil	Needs assessment / post-diagnostic support	Drop-in / hubs	Health professional involvement	Mentoring	Family/carer support	Telephone/email/online support	Collaboration and coordination with other	Social enterprise	Assistive technology (mobile apps/cloud based	Outreach services	Social media	Other	No details / not adults / not low-level	Total no. of reported components
47	Hull	Matthew's Hub			●	●						●									●						4
49	Yorkshire	Autism Plus	Multiple programmes	●	●				●												●						4
50	Sheffield	Sheffield Asperger Parents Action Group					●	●			●	●															4
62	Dorset	Dorset Adult Asperger Support (DAAS)		●			●						●			●											4
64	Manchester	ASGMA Autistic Society Greater Manchester area	Aspirations	●		●					●				●												4
72	National	Autism Initiatives				●		●							●								●				4
80	London	NAS	Ladbroke Grove Autism Centre	●	●				●		●																4
82	Gravesend (Kent)	NAS	SAND support centre	●	●				●		●																4
87	Harrow	Asperger Syndrome Access to Provision	Good food for the Soul	●					●		●	●															4
128	Derbyshire			●	●								●							●							4
133	Lewisham		Information, Support and Advice Service for Adults with Autism/Asperger Syndrome	●	●		●			●																	4
10	Swindon	Joint project between Swindon LIFT and SEQOL Autism Diagnostic Team	LIFT project and autism team project				●			●	●					●											4
13	Portsmouth	University of Portsmouth	Autism Centre for Employment		●	●								●			●										4

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31	Stockton-on-Tees	Daisy Chain Project	Increasing positive employment outcomes for young people with autism	●	●						●										●						4
71	St Helens	St Helens Autism and Asperger Union		●	●	●		●																			4
9	Kingston	Balance	Balance Asperger Team	●		●				●																	3
32	London	Caretrade Charitable Trust	Employment Opportunities	●	●	●																					3
52	Leicestershire	Leicestershire County Council / NAS	Leicestershire Autism Information Hub helpline				●								●				●								3
56	Nottingham	Nottinghamshire Healthcare NHS FT					●							●		●											3
70	Sefton	Sefton Asperger Group										●		●				●									3
76	Portsmouth / Basingstoke	Surrey and Borders Partnership NHS FT: Hampshire Autism service					●							●		●											3
88	Wokingham (Berkshire)	ASD Family Help		●	●				●																		3
89	Worcester	Worcester ASPIE		●				●	●																		3
91	Staffordshire	Lifeworks Staffordshire			●							●					●										3
92	Staffordshire	Staffordshire Adults Autistic Society		●	●						●																3
95	Shropshire	Autonomy							●	●				●													3

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100	Hertfordshire			●	●	●																					3
102	Enfield												●		●					●							3
113	Camden	Camden & Islington Foundation Trust (CIFT)					●							●		●											3
114	Croydon	Council, local service provider, and local voluntary organisation					●	●																●			3
115	Hammersmith and Fulham; Kensington and Chelsea; Westminster	ASSIST												●		●				●							3
117	Blackpool							●								●		●									3
130	Camden			●		●					●																3
134	Newham		Newham Asperger's/High Functioning Autism Service				●		●		●																3
23	National	National Autistic Society	NAS HelpTech														●					●			●		3
25	Bury	Bury College	Understanding Autism	●									●					●									3
14	South Glos	South Gloucestershire Council	Reaching Communities				●			●			●														3
11	Sheffield	Autism Plus	Autism Peer Advocacy	●				●				●															3

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19	Surrey	Surrey County Council	Employment Works for Autism	●	●	●																					3
29	Somerset	National Autistic Society	Somerset Adult Autism Respite Service								●							●							●		3
30	Derbyshire	Derbyshire Autism Services Group	Employment and Autism – Unlocking Untapped Potential		●							●	●														3
3	London	Asperger London Area Group (ALAG)	ALAG Peer Support	●				●																			2
15	Nottinghamshire	Nottinghamshire County Council	Autism Training Works	●																	●						2
21	Cambridgeshire	Red2Green	Aspirations	●		●																					2
24	West Yorkshire	HFT	Luv2MeetU								●														●		2
26	Manchester	Alice Darlington	Create and Smile	●																	●						2
34	UK-wide	Specialisterne UK	Specialisterne work and well-being project		●																				●		2
35	Slough	Slough Borough Council	Slough Autism Connect / Travel Champions	●									●														2
54	Nottinghamshire	Nottinghamshire County Council	Asperger's social care team									●		●													2
57	Nottingham	Nottingham City Asperger Service (NCAS)												●		●											2
60	Weston-s-Mare and N Somerset	BASS North Somerset				●				●																	2
66	Stockport	Stockport Metropolitan Borough Council				●								●													2

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		/ Stockport FLAG / Brothers of Charity																									
77	Oxford	Autism Oxford		●									●														2
79	London	NAS	Acton day service	●	●																						2
81	Croydon	NAS	Croydon day services	●					●																		2
83	Gravesend (Kent)	NAS	Windmill centre	●					●																		2
84	Godalming (Surrey)	NAS	Linden House	●		●																					2
85	London	Asperger London Area Group (ALAG)	Peer Support project	●				●																			2
96	Shropshire, Telford & Wrekin	STACS - Shropshire & Telford Asperger Carers Support		●														●									2
97	Sunderland	Autism in Mind						●				●															2
98	Cornwall	Debi Evans	Meltdown Mentors														●								●		2
109	Nottinhamshire	Nottinghamshire CC & Nottinghamshire NHS Trust	NHS Flo Simple Telehealth pilot scheme																			●			●		2
111	Thurrock		Spectrum					●	●																		2
120	East Sussex		Community Links			●				●																	2
121	Oxfordshire					●								●													2
131	Ealing	Ealing Council and CCG	ASSIST (Asperger Support, Signposting, and Information Services Team)			●												●									2

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138	Calderdale							●										●									2
5	Nottinghamshire	NORSACA = Autism East Midlands	Enterprise For Autism	●	●																						2
18	Knowsley	Knowsley Metropolitan Borough Council	Knowlsey Autism Innovation Programme						●		●																2
20	Cambridgeshire	Red2Green	Celebrating Autism										●												●		2
27	Hants, Berks, Oxfordshire	Circles South East	Early intervention										●						●								2
28	Thames Valley, Hampshire, Kent, Surrey, Sussex	Circles South East	Adapted Circles										●						●								2
6	Harrow	Asperger Syndrome Access to Provision	Good Food for the Soul	●																							1
16	E Sussex	East Sussex County Council	Spectrum Personal Development courses	●																							1
17	Lancs	Lancashire County Council	Autism Peer and Mentor Support Network					●																			1
22	National	Autism West Midlands	Connecting with Autism Community																					●			1
33	London	Caretrade Charitable Trust			●																						1
36	Croydon	Croydon Council	Developing arts skills and related work experience opportunities for		●																						1

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			young people with autism.																								
38	Windsor	Borough of Windsor & Maidenhead	Autism Employment Challenge		●																						1
40	St Helens	St Helens Council	Supported employment service		●																						1
42	Warwickshire	New Ideas Advocacy Project	College Without Walls	●																							1
44	Dorset	Dorset Healthcare University NHS Foundation Trust	Pan Dorset Sensory Integration Therapy																					●			1
46	Telford and Wrekin	Telford and Wrekin Council for Voluntary Service	Fulfilling Futures, life after school																				●				1
51	Leicestershire	Leicestershire Autistic Society									●																1
53	East Midlands	Autism East Midlands																					●				1
55	Nottingham	Autistic Nottingham and East Midlands						●																			1
58	Northamptonshire	Northamptonshire NAS				●																					1
65	Manchester	ASGMA Autistic Society Greater Manchester area	Lifeskills project			●																					1
67	National	Pure Innovations				●																					1
68	Knowsley	Autism Support Group Knowsley									●																1
74	Portsmouth	Autism Hampshire /	Specialist mentoring														●										1

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		University of Portsmouth																									
99	Nottingham												●														1
101	Norfolk	Norfolk County Council												●													1
108	Calderdale												●														1
122	Windsor and Maidenhead		Ways into Work service		●																						1
125	Worcestershire													●													1
127	Derby										●																1
132	Haringey	Haringey Council	Housing Need Identification Pilot																						●		1
135	Brighton and Hove		Open Arts / Art & Identity						●																		1
136	Plymouth	MIND	Recovery College courses	●																							1
137	Swindon	Independent user-led	Swindon Advocacy Movement									●															1
139	Kirklees	Autism Plus									●																1
37	York	City of York Council	Focus on Autism - York										●														1
7	N London	Black & Minority Ethnic Carers Support Service	Independence Support																							●	N/A
41	London	South London and Maudsley NHS Foundation Trust	People with autism spectrum disorder in criminal justice and mental health systems in south London																							●	N/A

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45	Wetherby	Learning to Listen and Autism Angels	Autism Angels																							●	N/A
105	Salford																									●	N/A
112	Barnet	Barnet council / local housing association																								●	N/A
124	Dorset / Bournemouth	Dorset CCG / Pan-Dorset ASC Partnership Board	Community Adult Asperger's Service																							●	N/A
129	Nottingham		Autism Partnership Board																							●	N/A

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