

**Beatriz López, Niko Kargas, Julie Udell, Tomáš Rubín, Linda Burgess, Dominic**

**Dew, Ian McDonald, Ann O'Brien and Karen Templeton-Mepstead**

**Evaluation of the ACE employment programme: Helping employers to make tailored adjustments for their autistic employees**

**Author affiliations:**

Beatriz Lopez is based at the Department of Psychology, University of Portsmouth, Portsmouth, UK.

Niko Kargas is based at the Department of Psychology, University of Lincoln, Lincoln, UK.

Julie Udell is based at the based at the Department of Psychology, University of Portsmouth, Portsmouth, UK.

Tomáš Rubín is based at the based at the Department of Psychology, University of Portsmouth, Portsmouth, UK.

Linda Burgess is based at Hampshire County Council, Winchester, UK.

Dominic Dew is based at Portsmouth City Council, Portsmouth, UK.

Ian McDonald is based at Southampton City Council, Southampton, UK.

Ann O'Brien is based at Isle of Wight Council, Newport, UK.

Karen Templeton-Mepstead is based at Autism Hampshire, Fareham, UK.

**Abbreviations:** Autism Centre for Employment (ACE), Profiling Assessment (PA),

National Autistic Society (NAS), All Party Parliamentary Group on Autism (APPGA)

Running head: Supporting employers to make adjustments

## **Abstract**

Purpose: The aim of this study was to explore the views of autistic people, carers, and practitioners regarding the barriers autistic employees face at work (Study 1) and to use these views to inform the design of an employment programme for autistic employees without learning disabilities (Study 2).

Design: In Study 1, 16 (20%) carers, 17 (21%) practitioners and 47 (59%) autistic adults who had been or were currently employed, answered a survey regarding barriers at work. In Study 2, we evaluated the efficacy of a set of Profiling Assessment tools (PA) developed to help employers make individually-tailored adjustments for their autistic employees by delivering an employment programme consisting of 15, 8-week work placements.

Findings: In Study 1, only 25% of autistic adults reported having had adjustments in the workplace, and all groups reported this as the main barrier - alongside employers' lack of understanding. Two sets of results demonstrate the efficacy of the PA tools in addressing this barrier. First, a comparative cost simulation revealed a cost saving in terms of on-job support of £6.67 per participant per hour worked relative to published data from another programme. Second, 83% of autistic employees reported having had the right adjustments at work.

Research limitations: This is an exploratory study that did not include a comparison group. Hence, it was not possible to evaluate the efficacy of the profiling assessment tools relative to a standard employment programme intervention, nor to assess cost reduction, which currently is only estimated from already available published data.

Practical implications: Overall the findings from these studies demonstrate that the time invested in high-quality assessment of the profile of autistic employees results in saving costs over time and better outcomes.

Originality/value: The originality of the ACE programme resides in that, unlike other programmes, it shifts the focus from helping autistic employees to helping their employers.

## Introduction

Despite numerous efforts, unemployment rates for autistic adults are still staggeringly low. According to a recent report by the National Autistic Society and the All Party Parliamentary on Autism Group (NAS-APPGA, 2019), in the UK, the current unemployment rate of 68% is still significantly higher than the one reported for other disability groups (51%). For those who find employment, they are likely to be in unskilled jobs with low wages (Howlin, 2000; Howlin, 2013; Roux *et al.*, 2015). The employment and underemployment rates are surprising given that 77% of unemployed autistic people report they would like to work (NAS, 2016) and that 47% of autistic adults without learning disabilities attend higher or further education (Taylor and Seltzer, 2011).

Addressing employment rates in this population is a key priority as the absence of paid work, or regular activities, has been linked to deteriorating mental health, social exclusion and poor quality of life (Emerson and Hatton, 2008; Jahoda, 1988; Burgess and Gutstein, 2007). Conversely, having a job has been shown to have positive effects in autistic adults in other areas of functioning such as social gains, expression skills and skill development (McLaren *et al.*, 2017; García-Villasamar *et al.*, 2002; Remington and Pellicano, 2019). To tackle unemployment rates, strategic action plans and legislative changes (e.g., Adult Autism Strategy, 2010, 2014) have been put in place alongside employment programmes targeting this population. Overall, employment programmes have been shown to be effective both in terms of finding work and increased wages (for a review see Hedley *et al.*, 2017), although there is a need for higher quality and independent evaluations (Hedley *et al.*, 2017; Roulstone *et al.*, 2013). However, there is limited evidence on how they contribute to sustained employment rates (Schall *et al.*, 2015). Despite the many qualities of autistic people such as attention to detail, honesty, persistence and reliability (Howlin, 1997), they

switch jobs often and have difficulties adjusting to job settings (Howlin, 2000; Hurlbutt and Chalmers, 2009). Autistic adults are also more likely to lose their employment on the basis of behavioural and social interaction aspects rather than an inability to perform the job (Dew and Alan, 2007). The precise reasons why this is the case remain relatively unexplored; it may be due to factors associated to social and executive function demands of the job or sensory issues. Alternatively, low retention rates may be explained by low autism awareness among employers' and/or lack of provision of adjustments in the work place (Hurlbutt and Chalmers, 2009).

Efforts have been made to raise autism awareness amongst employers, and the public in general. However the efficacy of these campaigns in improving attitudes has been questioned (Matthews, *et al*, 2015; White, *et al*, 2016). Attempts have also been made to provide guidelines employment programmes to improve the provision of adjustments in the workplace in. For instance, evidenced-based guidelines by the UK-based National Institute for Health and Care Excellence (NICE 2012) recommend in-work support for the employer and the employee and providing advice on making reasonable adjustments. While the sentiment behind awareness campaigns and the production of guidelines is laudable, a major barrier hampers their efficacy, namely, the heterogeneous nature of autism. For instance, autism awareness training for employers usually mentions sensory issues. However, research shows that there is large variability in auditory thresholds (Kargas *et al.*, 2015) and sensory modulation (Ben-Sasson *et al.*, 2019). Evidence of heterogeneity also comes from studies examining executive functioning (Geurts *et al.*, 2014) and studies hinting at the presence of subtypes within the Autism Spectrum (López *et al.*, 2008; Miles *et al.*, 2005). Given this variability, employment interventions, and any autism intervention for that matter, demand the provision of individually-tailored support for both employers and employees.

The aim of this study was to develop a cost-effective employment programme to enable individually-tailored support. Following recent calls for greater participation of autistic people in the development of support strategies and research (e.g., Milton, 2019), the first step in the development of this programme was to directly ask autistic employees, their carers and practitioners about their views on what are the barriers that autistic people face at work (Study 1). In a second stage (Study 2), we developed a programme to address the barriers identified in the consultation, the Autism Centre for Employment <sup>1</sup>(ACE) employment programme. Specifically, the aim of the employment programme was to test the efficacy of a set of Profiling Assessment tools (PA), which was developed to enable employers make individually-tailored adjustments at work, and also to facilitate the process of matching the person to a job.

### **Study 1- Identifying barriers to retain employment**

The first step in developing the employment programme was to identify the barriers autistic people face at work. To do so, we analysed a subset of data from a larger survey conducted in 2013 aimed at investigating, amongst other issues, perceptions on the implementation of the Adult Autism Strategy (2010), professional training resources, and volunteering (López and Keenan, 2014). We report here the analysis of a subset of responses to questions specifically related to the barriers autistic people face at work. For this reason we only included responses from autistic adults that had been or were currently employed, and their carers, and responses from practitioners whose jobs entailed providing employment support.

---

<sup>1</sup> The name of the Autism Centre for Employment has since changed to Autism Centre for Research on Employment (ACRE)

## **Method**

### *Respondents*

Autistic adults: Fifty-one autistic adults who had been or were currently employed completed the survey. Four respondents were excluded from the final sample because they did not report any diagnostic information. The mean age of the final sample of 47 respondents (16 female) was 40.5 years old (Median= 41) and SD=13.1 (Range-21-72).

Carers: Eighteen carers of autistic adults who had been or were currently employed completed the survey. The data from two carers who did not complete the entire survey were removed from the analysis. The resulting 16 respondents (13 females) had a mean age of 51.64 years (Median= 53) and SD= 10.97 (Range 43-76). All carers were mothers except for 1 spouse and 3 fathers. .

Practitioners: Eighteen practitioners reported providing employment support as part of their job role. Of these, one respondent submitted an incomplete survey. The resulting 17 participants (13 females) had a mean age of 44.7 years (Median= 50) and SD=13.6 (Range 21-64).

### *Materials*

The questions for practitioners were different from those asked to autistic adults and carers as practitioners informed on multiple people, while autistic adults and their carers reported on single cases.

Autistic adults and carers' survey: The set of questions from the survey relevant for the development of the employment programme were: '*Have you (this person) had support at work?*', '*What support have you/this person had at your/they current job?*', '*Which of the following adjustments have been made for you/them at your/their work place?*', '*What possible changes would have made your/their job easier?*'.

*Practitioners' survey:* Unfortunately, the only relevant question from the practitioners survey was, 'In your professional experience, what are the main barriers for people with autism when trying to access paid employment?'. Hence, the practitioners views need to be taken with caution. Although the question was broad, we selected only responses specifically mentioning job retention.

### *Procedure*

The link to the survey was disseminated via the Autism Research Network at the University of Portsmouth and the -no longer live- Autism Research, Policy and Practice Hub ([www.autismrpphub.org](http://www.autismrpphub.org)), at the Wales Autism Research Centre. The survey opened on the 5<sup>th</sup> December 2013 and was closed on the 30<sup>th</sup> January 2014. Ethical approval for this project was granted prior to the start of the project by the Ethics Committee of the Psychology Department at the University of Portsmouth.

## **Results**

### *Support in the work place*

Ten participants, 7 autistic respondents and 3 carers, did not provide a response regarding whether the person had received support at work. Of the 37 remaining respondents 24 autistic adults (64.9%) and 11 carers (68.75%) reported having no support at work. When asked about what type of support they had received, participants had the option of selecting more than one type of support. Responses to this question included having an understanding employer (12 responses), a mentor at work (4 responses) or being part of an employment programme (6 responses).

In terms of adjustments, only 12 autistic respondents (25.5%) and 4 carers (25%) reported that their employer had made adjustments in the workplace. The adjustments included having a person to talk to, sensory adjustments and adjustments in timetable and tasks.

### *Barriers to Employment*

The most common barriers identified related to lack of understanding from employers and lack of provision of appropriate adjustments in the work place. Specifically, out of all responses provided, lack of employers' understanding was mentioned by 3 autistic participants (23.1%), 5 carers (26.3%) and 10 practitioners (55.5%) and lack of provision of appropriate adjustments in the workplace by 7 autistic participants (53.8%), 4 carers (21.3%) and 6 practitioners (33.3%). Other barriers mentioned were difficulties with the recruitment process (4 responses) and lack of support (3 responses). Only 4 responses, from carers, referred to barriers relating to aspects of the condition such as social and communication difficulties, lack of confidence or coping strategies.

### **Discussion**

This study sought the views of autistic adults, carers and practitioners regarding the barriers autistic people face at work with the view of using the information to develop an employment programme to improve retention rates. While there were slight discrepancies between the different respondents groups, all groups consistently reported two main barriers, employers' lack of understanding and lack of provision of adjustments in the work place. These findings add to the consensus of the need to provide support for employers as well as for autistic employees (Richards, 2012; Nesbitt, 2000; NAS-APPGA,2019; NICE 2012). Given the nature of the survey, we could not establish whether the employers of the

respondents had received awareness training, however, only 25% of autistic adults and carers reported having had adjustments in the workplace, hence we focused the employment programme in providing help for employers to make adjustments in the workplace.

## **Study 2- The ACE employment Programme**

Based on the results from Study 1 the ACE employment programme focused primarily on supporting employers, although support was also provided autistic employees. Specifically, this programme aimed to develop, and evaluate, a set of employability and cognitive profiling tools to help employers to provide individually-tailored adjustments for their employees. The development of the tools was guided by previous research. Specifically, the tools focused on the most common challenges autistic people face at work, namely social interaction and communication skills, executive functioning (i.e., flexibility, organisation and emotional control) and sensory sensitivities (Hendricks, 2010; Muller, Schuler, Burton, Yates, 2003; Hurlbutt and Chalmers [2004](#)). The tools were developed in collaboration with two autistic adults. In view of the results from Study 1, which showed that lack of support at work was only viewed as a barrier by 3 respondents, support at work for autistic employees was provided in the first two weeks of the placements, but largely removed thereafter. The programme, delivered in collaboration with 4 local authorities and a local charity, consisted of 8-week unpaid placements supported by volunteer mentors.

## **Method**

### *Participants*

All autistic adults except one were referred to ACE by the 4 local authorities involved in the project. The eligibility criteria to enter the scheme were that they had had a formal diagnosis of autism, were over 18 years, had no learning difficulties, no known severe mental

health conditions, no criminal record and a willingness, and readiness, to gain employment. Autistic adults were recruited on a first come first served basis. Thirty autistic adults were initially referred for the programme, however, due to time constraints, only 18 work placements could be arranged. Of the initial 18 autistic adults (16 males, 2 females), three did not complete their placements; one because of recurrent health issues, one because she decided to seek paid employment instead and one stopped her placement because she decided that '*work was not for her*'. The final sample of employees consisted of 15 men with an average age of 28.47 years (SD=8.39). In total there were 15 employers, 9 males and 6 females. One employee was autistic himself, and 4 employers had an autistic relative. The age of the employers was not recorded.

### *Materials*

Profiling Assessment (PA) tools: At the very start of the programme we developed, and piloted, a set of Profiling Assessment tools specifically designed for autistic people in the workplace. These included the assessment of the Employability and Cognitive Profiles of each participant via an on-line self-report questionnaire specifically developed by the ACE team<sup>2</sup>. The Employability section of the questionnaire assessed two areas, career interests and employment preferences. The career interest questions were based on Holland's (1997) Theory of Career typology: Realistic (e.g., *Build kitchen cabinets*), Investigative (e.g., *Work in a biology lab*), Artistic (e.g., *Paint sets for theatre plays*), Social (e.g., *Teach children to read*), Enterprising (e.g., *Sell merchandise over the phone*) and Conventional (e.g., *Perform filing tasks in an office*) careers. This section comprised of 60 items (10 items per career category). Participants were asked how

---

<sup>2</sup>The Profiling Assessment tools have undergone extensive revisions (i.e., inclusion of work values and strengths) and are now available online at [port.ac.uk/acre/employment](http://port.ac.uk/acre/employment).

interesting they found each job listed regardless of their qualifications. Responses were measured on a Likert scale from 1 (this doesn't sound at all interesting) to 5 (this sounds really interesting). The employability skills consisted of 89 questions measuring 9 skills: Creativity (e.g., *Make objects/crafts*), verbal and written communication (e.g., *Explain facts; Write a formal letter*), numerical (e.g. *Do mental calculations*), practical (e.g., *Assemble components*), organising (e.g., *Identify the steps of a project*), problem solving (e.g., *Think of alternative solutions*), social and influencing skills (e.g., *Work with others*). Responses were rated on a scale from 1 (not at all like me) to 5 (like me).

The Cognitive Profile questions assessed three areas relevant to autism, social interaction and communication skills, executive function and sensory sensitivities. The social interaction and communication skills section comprised of 29 items measuring four aspects of social interactions and communication: Non-verbal Communication (e.g., *I look at people when talking to them*), Conversational skills, (e.g., *I take turns in conversations easily*), Communication ability (e.g. *I am able to express my feelings*) and Confidence in communicative ability (e.g., *I find it difficult to speak in front of a group of people*). In addition the questionnaire assessed communication preferences (i.e., via e-mail, phone or face-to-face (e.g., *I am comfortable answering emails; I am comfortable placing calls*). The Executive functioning section comprised of 31 items including questions about planning and organising (e.g., *I can plan ahead*), disruptions to routine (e.g., *Changes to my routine upset me*), attention (e.g., *I can make mistakes easily*), task switching (e.g., *I find it difficult to work on two tasks at the same time*) and emotional control (e.g., *I can get very nervous over small things*). The Sensory sensitivities questionnaire comprised of 22 questions about Visual (e.g., *I notice small visual changes in the environment that other people do not notice*), Auditory (e.g., *I find particular sounds especially disruptive*), and other sensory sensitivities (e.g., *Wearing certain fabrics disturbs me*).

Programme evaluation: A programme evaluation survey was designed to explore employers' changes in attitudes towards autistic employees and in autism awareness and their satisfaction with the scheme. The employee's survey explored changes in confidence in their own abilities and on gaining employment, their satisfaction with scheme, the extent and quality of adjustments in the workplace and quality and quantity of support provided by mentors.

To measure mood both employers and employees' completed the Positive and Negative Affect Schedule (PANAS-X; Watson & Clark, 1988). This scale consists of 44 mood adjectives which respondents score on a 1 (very slightly or not at all) to 5 (extremely) scale. Participants also completed the Rosenberg Self-esteem scale (Rosenberg, 1965), which consists of 10 items scored on a 1 (strongly Disagree) to 4 (Strongly Agree) scale. Employers completed the Quality of Working Life scale (QoWL; Easton & Van Laar, 2012) both at the start and at the end of the work placements, while employees only completed it at the end of the placements. This scale contains 36 items, scored 1 (Strongly Disagree) to 4 (Strongly Agree). Employers also completed the Work Personality Profile (Bolton & Roessler, 1986) at the end of the placement to evaluate their perception of the strengths and weaknesses of their employee. In this scale employers rate 58 performance areas on a 1 to 4 scale where 1 reflects a definite problem and 4 a definite strength.

### *Procedure*

Ethical approval for this project was granted by the University of Portsmouth Ethics Committee prior to the start of the project.

Referral and Profiling Assessment (PA): On receipt of the referral, participants were invited to complete an online questionnaire to assess their Cognitive and Employability profiles. Once they had completed the questionnaire, they were invited to the university for a face-to-face assessment interview. The interview consisted of a series of pre-

determined follow-up questions assessing each of the areas of the questionnaire.

Participants were only asked a subset of the questions depending on their answers to the questionnaire. For instance, if they had reported they had sensitivity to lighting, then a series of questions were asked to explore the specific types of lighting the participant was sensitive to, what effect it had on them, and whether they had any existing coping strategies.

Matching the participant to a work placement: It was core to our strategy to find placements based tailored to the strengths, qualifications and career preferences of each participant rather than identifying work placements in advance. This was the most challenging part of the project as success rates were low, partly due to the time frame of the project as some employers were willing but could not provide the placements at short notice. However, some employers voiced their concerns regarding the amount of support the employees would need and rejected taking part. Without exception, participants accepted the placement they were offered.

Person-centred employer and mentor training: All employers and mentors received person-centred training about their particular employee/mentee. A member of the ACE team went over the reports with the participant, mentors and employers to ensure any queries arising from the reports were answered, and also to gather feedback from participants regarding the content. The reports included recommendations to employers about possible adjustments, which varied according to the profile of their employee. These adjustments focused on their cognitive profile. Examples of adjustments included: assignment to tasks that did not involve making telephone calls or allowing the employee time to process information (social and communication profile), assignment to tasks that could be performed in a linear fashion rather in parallel or discussing the best way to avoid anxiety-triggering situations (flexibility and emotional control), allowing the use of headphones or making allowances regarding the use

of uniform (sensory sensibilities). At this point we gave employers and participants the pre-programme evaluation packs.

Supported 8-week work placements: We secured 18 part-time unpaid work placements.

The nature of the placements varied widely; three were in retail, 6 administrative jobs, 2 web/mobile app developers, 2 technicians and 2 art-related jobs. The hours of work ranged from 8 to 15 hours a week depending on the participants' and the employers' preferences.

As placements were unpaid, the travelling expenses for participants and their mentors were paid. As mentioned earlier, unfortunately, three participants did not complete their placements. Placements took place between May and July 2015.

Support to employers and employees: Placements were supported by 9 volunteer mentors and 2 part-time paid mentors. Mentors and participants met prior to the start of the placement for a briefing session to discuss the support needs of the participant. In training sessions it was emphasised that the role of the mentors was not to help the client to perform the job but to support the communication between employers and employees so that the amount of support could be scaled down over time. The contact times that each mentor spent with their participant decreased significantly over the course of the placements. The first week, mentors spent all working hours with each participant; however, this support was reduced by week 3 to an average of 2 hours a week. From then on, mentors were available on the phone if support was needed.

## **Programme evaluation**

### *Employers' outcomes*

Fourteen employers agreed to provide data for the evaluation of the project, however, only 12 employers returned their post-placement evaluation packs.

Autism awareness and satisfaction with scheme and support: All employers reported that the work placement scheme had been a positive experience. Specifically all employers found the experience to be positive on a personal level and 10 employers (83%) found the experience was positive for the organisation. Also, all employers agreed that participating in the scheme had given them useful information of the value of autistic employees and that overall it had been a positive experience for them. Eleven employers (92%) felt that their knowledge of autism has increased by taking part in this scheme and 10 employers (83%) reported that participating in the scheme had increased their confidence in their ability to manage an autistic employee. In terms of the training and support from mentors, 9 employers (75%) reported that the training received helped them to support their employee and 11 (92%) reported that the mentor made them feel more confident. Before the placements only 2 employers (17%) reported that they would be likely to employ an autistic person in the future, this figure raised to 7 employers (58%) at the end of the placements.

Employers' perceptions of strengths and weaknesses of employees: Employers rated their employees performance on a scale were 4 is a definite strength and 1 a definite weakness (Work Personality Profile, Bolton & Roessler, 1986). The overall average score across all items was 3.58 (SD=2.3), which suggests that employers rated employee's performance highly overall. Only three items were rated on average below 3. These were: '*Appears comfortable in social interactions*' (M=2.83, SD=0.99), '*Initiates conversations with others*' (M=2.72, SD=0.96), and '*Displays good judgment in playing practical jokes or 'horsing around*' (M=2.8, SD=1.17). However, employers did not provide ratings for some items relevant to autism. For instance, only 2 to 4 employers provided ratings for items relating to group tasks, or interaction with co-workers.

Impact of the placements on employers' mood, self-esteem and quality of working life: For a summary of scores please see Table 1. The results of a series of t-test analyses performed to

compare outcome measures pre – and post-intervention revealed no significant changes in either Negative or Positive Mood, Self-esteem nor Quality of Working Life ( $p=.391$ ,  $p=.607$ ,  $p=.813$ ,  $p=.289$ , respectively).

### *Employees' outcomes*

Fifteen participants completed their placements. We report here data from the 12 participants that returned the post-placement evaluation forms.

Confidence, satisfaction with scheme, and with the support provided by mentors, and effectiveness of work adaptations: Overall, most employees (83%) reported having enjoyed the experience. Almost all participants (92%) reported that the placement had helped them to feel more confident in their own skills and made them feel better about themselves. An important, although not specifically sought result was that the placements also helped them to feel more included as 9 employees (75% of participants) reported having made friends during the placements. However, only 7 employees (58%) reported feeling that the experience had served to increase their chances of gaining employment in the future.

Most important for the validation of the assessment tools developed in this project, 10 employees (83%) felt that the employer had made the right adjustments in the work place for their individual needs and probably, as a consequence, only 2 employees (17%) reported that they would have liked more hours of mentoring.

Impact of placements on employees' mood, self-esteem and quality of working life: For a summary of outcome evaluation scores please see Table 1<sup>3</sup>. A series of one-tail t-tests revealed that Negative Mood scores significantly decreased from pre- to post-placement ( $t(9) = -4.409 = p=.002$ ,  $d=1.51$ ) and there was also a significant increase in Self-esteem scores

---

<sup>3</sup> Please note results for positive and negative mood are based on only 10 employees, as two did not complete the PANAS-X scale

( $t(11) = -2.762 = p = .018, d = 0.53$ ). In contrast, although positive mood scores increased (See Table 1), this increase did not reach statistical significance ( $t(9) = 1.509 = p = .116, d = 0.49$ ). The post hoc power of the t-test analyses on the basis of the actual effect sizes, sample sizes and  $\alpha = 0.05$  (one-tailed) was calculated using G\*Power (Faul, Erdfelder, Buchner and Lang, 2009), revealed power levels of .990, .826 and .401 for negative mood, self-esteem and positive mood, respectively.

We could not measure quality of working life prior to the commencement of the placement but the mean score for quality of working life reported by the employees at the end of the placements was 3.91 (SD= 0.55), which two one-sample t-tests revealed to be significantly above the mean of both NHS (Mean=3.44;  $t(11) = 3.01, p = .006$ ) and university staff (Mean=3.40;  $t(11) = 3.26, p = .004$ ) (Easton & Van Laar, 2012).

#### *Comparative cost simulation*

To assess the cost-effectiveness of the programme, we conducted a comparative cost simulation relative to the cost analysis reported by Mowhood and Howlin (1999). As in their study, we simulated the cost of mentoring support per participant per hour. This was calculated by multiplying the number of hours of support received by the 15 participants (540 hours) by the cost of employment per hour, had we paid mentors at the middle of the Grade 4 scale (£14.80 per hour). This gave a total support cost of £7722. We then divided the resulting £7722 of total support cost by the total number of worked hours by the 15 participants in the 8 weeks, approximately 1440. This gave a mentoring cost of £5.36 per participant per hour. Mowhood and Howlin (1999) reported a cost of £6.81 per participant per hour which considering inflation would be equivalent to £12.22 in 2015. Hence, we estimate an estimated cost saving of £6.86 per participant per hour.

## Discussion

This pilot study evaluated, via an 8-week work programme, a set of profiling tools aimed at giving employers advice on workplace adjustments tailored to the specific needs of their autistic employees without learning disabilities. In the survey conducted in Study 1, only 25% of autistic respondents reported having had adjustments in their workplace. By contrast, 83% of the autistic participants in Study 2 reported that their employer had made the right adjustments for them, a finding suggesting that providing person-centred recommendations may be an effective approach to improve the provision of adjustments in the work place. The findings also suggest that this approach could result in a relative low cost of the employment programme, as a consequence of the reduced need of on-job support (i.e., two hours a week support by Week 3). A comparative cost simulation revealed an estimated cost saving of £6.86 per participant per hour worked relative published costings of another programme Mowhood and Howlin (1999). Despite the reduction in support, only two employees (17%) reported that they would have liked more support. More importantly, the outcomes of the evaluation revealed a significant increase in autistic participants' self-esteem, a significant reduction in negative mood and a marginally significant increase in positive mood by the end of the placements.

Despite the promising results two findings give reason for concern. Although 92% of autistic participants reported feeling more confident about their skills after the programme, only 58% reported having confidence in finding work in the future. Regrettably, their perception that their employment chances are low may be justified. Only 58% of employers –relative to 17% before the placements- reported that they would be likely to employ an autistic employee in the future. While this finding confirms the benefits of intergroup contact in improving attitudes towards the outgroup (Allport, 1954), it suggests that negative attitudes towards autistic employees (for a review see Unger, 2002) may be hard to shift and require

alternative approaches. Evidence shows that autism awareness campaigns are effective at increasing awareness and knowledge about the condition (e.g., Dillenburger, *et al.*, 2013). However, their effectiveness in improving stereotypes and attitudes has been questioned (Matthews, *et al.*, 2015; White, *et al.*, 2016). Hence, future research needs to explore alternatives, such as the effectiveness of underpinning awareness campaigns on the concept of neurodiversity (i.e., the idea that autism is just part of human variation) rather focusing on autism as a disease or disorder (e.g., Runswick-Cole, 2013).

Even if autism awareness campaigns were effective in changing employers' attitudes, the heterogeneity of autism (Kargas *et al.*, 2017; Geurts *et al.*, 2015) still demands that employers are given specific advice regarding the support needs of their autistic employees. However, in this study we focused on identifying areas of needs rather than areas of strengths. This is a considerable limitation of the study and the profiling tools developed. Evidence consistently shows that autism is characterised both by weaknesses and strengths, such as attention to detail (Frith, 2003), originality of thought (Asperger, 1944/1991), honesty or persistence and reliability (Howlin, 1997). Based on these strengths and on the Positive Psychology approach (Seligman and Csikszentmihalyi, 2014), increasingly researchers and practitioners have been calling for employment programmes that focus on strengths rather than needs (e.g., Lorenz, Frischling, Cuadros and Heinitz, 2017; Wong, Donnelly, Neck and Boyd, 2018). While there is still a dearth of rigorous studies evaluating the effectiveness of this approach in work contexts, evidence from educational contexts have provided promising results (Carter *et al.*, 2015; Lanou, Hough and Powell, 2012). We are currently revising the profiling tools in collaboration with autistic adults, carers and practitioners, to include strengths both in the questionnaire and on the report, which we hope to validate shortly.

Another important limitation of the study is the small number of employees taking part. Despite the small sample size, the effect size for the decrease in negative mood was very

large ( $d=1.51$ ) and moderate for the increase of self-esteem ( $d=0.53$ ), and the power of the analyses was sufficient. These results have important implications. First, they indicate that employment programmes may help to ameliorate the common mood disorders prevalent in autism (for a review see Matson and Williams, 2014), regardless of their efficacy in helping participants to find employment. Second, self-esteem and confidence are personal attributes highly valued by employers (e.g., Andrews and Higson, 2008; Cumming, 2010). Hence, although employment programme outcomes are traditionally measured in terms of actual employment measures (e.g., number of people employed or earnings), future research will need to examine their impact on well-being and development of personal attributes valued by employers.

Although encouraging, the findings from this pilot study need to be taken with caution. First, the employees were self-selected and hence already motivated to work and also the employers that agreed to take part were likely to be sympathetic to autism in the first instance. This is even more problematic if we consider that most results are based on subjective ratings. Also the cost-saving data is based on a simulation, Future research will need to evaluate the cost savings relative to running a comparison employment programme.

### *Conclusions*

These studies combined suggest that, first, more emphasis needs to be placed in supporting employers in making individually-tailored adjustments for their autistic employees and second, that investing in a profile assessment of autistic employees can result in a reduction of the need of support at work, and hence of the costs of delivering employment programmes. The results also point to the need to take a wider lens to the evaluation of employment programmes that takes into account their benefits to well-being and the development of personal attributes valued by employers.

## **Acknowledgements**

First of all, we would like to thank the UK Department of Health, for funding Stage 2 of this project via the Autism Innovation fund. Many people contributed to this project. We would like to give special thanks to all the employers, and volunteer mentors (Tony Adams, Jacquie Berger, Grace Cooper, Kristine Edvarsen, Tracey Emery, Jessica Eng, Miguel Tiago Lopes, Annabel Nyemecz and Veronica Price). We would also like two anonymous reviewers for their very helpful comments on an earlier version of this manuscript. And last, but by no means least, thank you to all the autistic people who took part in the work placements. They were the best representation of the qualities autistic people can bring to the work place.

## References

- Andrews, J. and Higson, H. (2008). Graduate employability, ‘soft skills’ versus ‘hard’ business knowledge: A European study. *Higher education in Europe*, 33(4), 411-422.
- Asperger, H. (1944). *Die "autistischen Psychopathen" im Kindesalter*. *Archiv für Psychiatrie und Nervenkrankheiten*, 117, 76-136. Translated in U. Frith (1991), *Autism and Asperger syndrome* (pp. 37—92). Cambridge, UK: Cambridge University Press.
- Ben-Sasson, A., Hen, L., Fluss, R., Cermak, S.A., Engel-Yeger, B. and Gal, E. (2019). A meta-analysis of sensory modulation symptoms in individuals with Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders*, 39, 1–11.
- Burgess, A. F. and Gutstein, S. E. (2007). Quality of life for people with autism: Raising the standard for evaluating successful outcomes. *Child and Adolescent Mental Health*, 12(2), 80-86.
- Carter, E. W., Boehm, T. L., Biggs, E. E., Annandale, N. H., Taylor, C. E., Loock, A. K., & Liu, R. Y. (2015). Known for my strengths: Positive traits of transition-age youth with intellectual disability and/or autism. *Research and Practice for Persons with Severe Disabilities*, 40, 101-119.
- Cumming, J. (2010). Contextualised performance: Reframing the skills debate in research education. *Studies in Higher Education*, 35(4), 405-419.
- Department of Health (2010). *Fulfilling and rewarding Lives: The strategy for adults with autism in England*.
- Department of Health (2014). *Think autism: An update on the adult autism strategy*.
- Dillenburger, K., Jordan, J. A., McKerr, L., Devine, P., & Keenan, M. (2013). Awareness and knowledge of autism and autism interventions: A general population survey. *Research in Autism Spectrum Disorders*, 7, 1558-1567.

- Easton, S. and Van Laar, D. (2013). *User Manual for the Work-Related Quality of Life (WRQoL) Scale*. University of Portsmouth. UK.
- Emerson, E. and Hatton, C. (2008). *Estimating Future Need for Adult Social Care for People with Learning Disabilities in England*. Centre for Disability Report, University of Lancashire.
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G\*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*, 1149-1160.
- Frith, U. (2003). *Autism: Explaining the enigma*. Blackwell Publishing.
- García-Villamizar, D., Wehman, P. and Navarro, M. D. (2002). Changes in the quality of autistic people's life that work in supported and sheltered employment. A 5-year follow-up study. *Journal of Vocational Rehabilitation, 17*(4), 309-312.
- Geurts, H., Sinzig, J., Booth, R. and HappÉ, F., 2014. Neuropsychological heterogeneity in executive functioning in autism spectrum disorders. *International Journal of Developmental Disabilities, 60*(3), pp.155-162.
- Hendricks, D. (2010). Employment and adults with autism spectrum disorders: Challenges and strategies for success. *Journal of Vocational Rehabilitation, 32*(2), 125-134.
- Hedley, D., Uljarević, M., Cameron, L., Halder, S., Richdale, A. and Dissanayake, C., 2017. Employment programmes and interventions targeting adults with autism spectrum disorder: A systematic review of the literature. *Autism, 21*(8), pp.929-941.
- Holland, J.L. (1997). *Making vocational choices: A theory of vocational personalities ad work environments* (3<sup>rd</sup> ed.). Odessa, FL: Psychological assessment Resources Inc.
- Howlin, P. (2000). Outcome in adult life for more able individuals with autism or Asperger syndrome. *Autism, 4*, 63-83.

- Howlin, P. (2013). Social disadvantage and exclusion: Adults with autism lag far behind in employment prospects. *Journal of the American Academy of Child and Adolescent Psychiatry*, 2(9), 897-899.
- Hurlbutt, K. and Chalmers, L. (2004). Employment in adults with Asperger syndrome. *Focus on Autism and Other Developmental Disabilities*, 19, 215-222.
- Kargas, N., López, B., Reddy, V. and Morris, P. (2015). The relationship between auditory processing and restricted, repetitive behaviors in adults with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 45, 658-668.
- Lanou, A., Hough, L., & Powell, E. (2012). Case studies on using strengths and interests to address the needs of students with autism spectrum disorders. *Intervention in School and Clinic*, 47, 175-182.
- López, B., Leekam, S. R. and Arts, G. R. (2008). How central is central coherence? Preliminary evidence on the link between conceptual and perceptual processing in children with autism. *Autism*, 12(2), 159-171.
- López, B. and Keenan, L. (2014). *Barriers to employment in autism: future challenges to implementing the Adult Autism Strategy*. Autism Centre for Research on Employment. Retrieved from: <http://www2.port.ac.uk/media/contacts-and-departments/psychology/ace/Barriers-to-employment.pdf>
- Lorenz, T., Reznik, N., & Heinitz, K. (2017). A different point of view: The neurodiversity approach to autism and work. *Autism: Paradigms, Recent Research, and Clinical Applications*. Berlin: Intech.
- Matson, J. L., and Williams, L. W. (2014). Depression and mood disorders among persons with autism spectrum disorders. *Research in developmental disabilities*, 35(9), 2003-2007.

- Matthews, N. L., Ly, A. R. and Goldberg, W. A. (2015). College students' perceptions of peers with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 45(1), 90-99.
- Mawhood, L. and Howlin, P. (1999). The Outcome of a Supported Employment Scheme for High Functioning Adults with Autism or Asperger Syndrome. *Journal of Autism: the international journal of research and practice*, 3(3), 229-254.
- McLaren, J., Lichtenstein, J.D., Lynch, D., Becker, D. and Drake, R. (2017). Individual Placement and Support for People with Autism Spectrum Disorders: A Pilot Program. *Administration and Policy in Mental Health*, 44, 365–373.
- Miles, J. H., Takahashi, T. N., Bagby, S., Sahota, P. K., Vaslow, D. F., Wang, C. H., ... & Farmer, J. E. (2005). Essential versus complex autism: definition of fundamental prognostic subtypes. *American journal of medical genetics Part A*, 135(2), 171-180.
- Milton, D. (2019). Beyond tokenism: Autistic people in autism research. *The Psychologist*, 32, 2-3.
- Müller, E., Schuler, A., Burton, B. A., & Yates, G. B. (2003). Meeting the vocational support needs of individuals with Asperger syndrome and other autism spectrum disabilities. *Journal of Vocational Rehabilitation*, 18(3), 163-175.
- National Autistic Society (2016). The Autism Employment Gap. Retrieved from: <https://www.autism.org.uk/get-involved/media-centre/news/2016-10-27-employment-gap.aspx>
- National Autistic Society and All Party Parliamentary Group on Autism (2019). The Autism Act: Ten years on. Retrieved from: <https://www.autism.org.uk/get-involved/media-centre/news/2019-01-17-autism-act-10-years-on.aspx>

- National Institute for Health and Clinical Excellence (2012). Autism: Recognition, referral, diagnosis and management of adults on the autism spectrum. *National Clinical Guidelines Number 142*. The British Psychological Society and the Royal College of Psychiatrists.
- Nesbitt, S. (2000). Why and why not? Factors influencing employment for individuals with Asperger syndrome. *Autism*, 4, 357-369.
- Remington, A. and Pellicano, E. (2019). Sometimes you just need someone to take a chance on you': An internship programme for autistic graduates at Deutsche Bank, UK. *Journal of Management and Organization*, 25, 516–534.
- Richards, J. (2012). Examining the exclusion of employees with Asperger syndrome from the workplace. *Personnel Review*, 41, 630-646.
- Rosenberg, M. (1965). Rosenberg self-esteem scale. *Acceptance and commitment therapy. Measures Package*, 61.
- Roulstone, A., Harrington, B. and Hwang, S. K. (2014). Flexible and personalised? An evaluation of a UK tailored employment support programme for jobseekers with enduring mental health problems and learning difficulties. *Scandinavian Journal of Disability Research*, 16(1), 14-28.
- Roux, A.M., Shattuck, P.T., Rast, J.E., Rava, J.A. and Anderson, K.A. (2015). National autism indicators report: Transition into young adulthood. *Life Course Outcomes Research Program*, AJ Drexel Autism Institute, Drexel University, Philadelphia, PA.
- Runswick-Cole, K. (2014). 'Us' and 'them': the limits and possibilities of a 'politics of neurodiversity' in neoliberal times. *Disability & Society*, 29(7), 1117-1129.
- Schall, C.M., Wehman, P. and Brooke, V. (2015) Employment interventions for individuals with ASD: the relative efficacy of supported employment with or without prior project SEARCH training. *Journal of Autism and Developmental Disorders*, 45, 3990–4001.

- Unger, D. D. (2002). Employers' attitudes toward persons with disabilities in the workforce: myths or realities? *Focus on Autism and other Developmental Disabilities, 17*(1), 2-10.
- Watson, D., Clark, L. A. and Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063.
- White, D., Hillier, A., Frye, A. and Makrez, E. (2019). College students' knowledge and attitudes towards students on the autism spectrum. *Journal of Autism and Developmental Disorders, 49*(7), 2699-2705.

Table 1. Means and standard deviations of outcome evaluation measures pre- and post-intervention for employers and employees.

		Negative Mood		Positive Mood		Self Esteem		Quality of Working Life	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post
Employers	Mean	17.50	16.08	34.67	33.67	25.08	24.96	3.93	3.82
	SD	4.48	5.69	7.43	6.94	4.895	4.92	3.58	.54
Employees	Mean	23.10	14.60	28.7	32.82	17.7	19.58	-	3.91
	SD	7.28	3.72	6.78	9.89	4.00	2.85		.52