The strengths and abilities of autistic people in the workplace

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Abstract

Introduction: At present, very few autistic people are employed, even though many want to be. It is important that their strengths are identified and valued in order to help them to find jobs which they enjoy, and which make good use of their skills. The aim of this study was to investigate what strengths autistic people have in the workplace, self-reported by autistic people themselves.

Methods: In this study, autistic participants (*n*=66) completed an online questionnaire that asked their views about employment-related strengths that they experienced. We analysed these data using thematic analysis to identify commonalities across participants' experiences, and areas where they felt that they could perform better than their non-autistic colleagues.

Results: The main strengths identified from these data revealed cognitive advantages such as superior creativity, focus and memory, increased efficiency, personal qualities such as honesty and dedication, and the ability to offer a unique autism-specific perspective.

Conclusions: Overall, this study suggests that autistic people have many employment-related strengths that should be recognised and valued by autistic people and employers alike. By understanding the strengths that could be associated with autism in the workplace, autistic people may be better able to identify their own strengths in the workplace (with the help of support workers, where necessary). The results should also encourage employers to make an effort to recruit and retain autistic employees; making appropriate adjustments to interview processes and working conditions, and seeking out training when needed.

Lay Summary

Why was this study done?

At the moment, very few autistic people are employed, even though many want to be. One reason for this might be that non-autistic people focus on things that autistic people find difficult, and ignore things that autistic people can do well. To address this, it is important to make people more aware of strengths that autistic people have, and make sure that they are valued.

What was the purpose of this study?

We did this study to find out what strengths autistic people have in the workplace, as suggested by autistic people themselves.

What did the researchers do?

In this study, we asked autistic people to fill out an online questionnaire that asked their views about the strengths that they experienced at work. A total of 66 people completed the questionnaire. We read through everyone's answers, and put them into groups of similar responses. In that way, we could identify the areas where the autistic participants felt that they could perform better than their non-autistic colleagues.

What were the results of the study?

The participants in our study wrote about many areas of strength and skill at work. The main strengths that they mentioned were advantages related to ways of thinking (like being able to pay attention to tasks well), getting tasks done more efficiently, and personal qualities such as honesty and dedication. They also wrote about how being autistic meant that they could offer a unique view on situations at work.

What do these findings add to what was already known?

This was the first study to look at autistic people's experiences of skills in the workplace. Other studies have considered skills more generally, rather than focussing on employment – or have used other people's views about autistic skills, rather than autistic people's own views.

What are potential weaknesses in the study?

To take part in our study, people had to be able to fill out an online questionnaire. This can be difficult for people with intellectual impairment or other language/communication difficulties, which means that some autistic people might have been excluded from our research. More research should be done to understand the skills of people with a wider range of communication differences. Those who took part in our study were also different from the autistic population as a whole – for example, most were female and worked in education. This means that we should not presume that the strengths found in our study are the shared by all autistic people.

How will these findings help autistic adults now or in the future?

We think that these results could be important to employers, those working with autistic people, and autistic people themselves. By understanding the strengths that could be associated with being autistic in the workplace, autistic people may be better able to identify their own strengths in the workplace. This may enable them to find a job that they enjoy and excel at. The results should also encourage employers to make an effort to give jobs to autistic people; making changes to interview processes and working conditions, and seeking out training when needed. Overall, this study suggests that autistic people have many employment-related strengths that should be recognised and valued by autistic people and employers alike.

Introduction

A recent survey by the Office of National Statistics found that just 22% of autistic adults in the UK held any kind of paid job[1]. This falls far short of the employment rate of 80% amongst non-disabled adults and 54% of all disabled adults[2]. Given that 77% of unemployed autistic people report wanting to work[1], more needs to be done to support autistic adults into employment.

Historically, research into autism has focused on the challenges faced by autistic people, such as difficulties with social communication[3], mental health problems[4] and increased vulnerability[5]. Studies also aim to identify and ameliorate the specific difficulties faced by autistic people in the workplace, such as difficulty communicating with colleagues and supervisors, executive function challenges and increased levels of work-related stress and anxiety[6]. Although this is important work, researchers have begun to focus on identifying the strengths that can be associated with autism.

Identifying these strengths encourages employers to recognise the value of neurodiversity in the workplace. Neurodiversity is the concept that neurological differences (e.g., autism, attention deficit hyperactivity disorder (ADHD), dyslexia) are natural variations of the human brain which should be valued and respected[7]. The appreciation of this diversity is crucial, as there remains much stigma connected with being autistic in the workplace[8], and that these negative stereotypes may play a role in the disproportionately low employment rates for autistic people[9]. Within the neurodiversity framework, autism is conceptualised using the social model of disability: where the poor fit between a person's characteristics and the characteristics of the person's social context give rise to any disability encountered. This does not negate the need for support and services for autistic people, but stresses that these interventions should improve quality of life while respecting and preserving autistic culture[10].

Early research into the strengths of autistic people focused on savant abilities, such as the ability to perform rapid mental mathematical calculations, or draw detailed scenes from memory[11]. However, these savant skills are relatively rare[12] and researchers have now begun to investigate what strengths might be relevant to a wider autistic population. For example, Mottron et al.[13] found evidence to suggest that autistic people have an enhanced local processing ability compared to neurotypical (NT) people, meaning they are more likely to focus their attention on small details before processing the bigger picture (making them more efficient at certain tasks). Attwood[14], identifies that autistic people are likely to be reliable, in

possession of a sense of social justice and integrity, attentive to detail, original in problem solving and honest. Russell et al.[15] interviewed 24 autistic participants about strengths that they identified as being related to their autism. The most commonly reported traits were 'the ability to hyperfocus, attention to detail, good memory and creativity' as well as personal qualities such as 'honesty, loyalty and empathy for animals or for other autistic people' (p.30).

These strengths are likely to be extremely relevant in the workplace, and there is a growing body of anecdotal evidence to support this. In particular, there has been much discussion about how autistic traits may be of benefit to those in the technology industry[16], with companies such as Microsoft and Google actively recruiting autistic employees. Similarly, the European organisation Auticon only hires autistic IT consultants to perform work for businesses which they believe NT employees might find more challenging.

Despite this anecdotal evidence, at present there is little academic, peer-reviewed research to support such claims. The most recent and most comprehensive research into this area comes from Scott et al.[17], who conducted a scoping review of 134 studies that discussed the factors impacting employment for autistic people, including strengths. Content analysis revealed strengths such as good attention to detail, a strong sense of morality, superior intellectual functions and technical abilities. However, most of the data came from studies that analysed the efficacy of employment interventions and was largely provided by employers. Given the importance of participatory and emancipatory research in disability studies[18], it is important for research to include the viewpoints of autistic people themselves.

Wong et al.[19] go some way towards achieving this, conducting an auto-ethnographic study of strengths associated with autism in the workplace based on Wong's lived experiences as an autistic person. They identified a number of strengths including honesty, intense focus, fixation on details and strengths in cognitive and visual thinking; all of which aided Wong in his various careers. However, the findings (based on a single participant) are not necessarily generalisable to a wider autistic population. It will, therefore, be useful to consult with a larger number of autistic people to identify the extent to which such strengths are applicable to a wider autistic population.

As such, the aim of this study is to investigate the strengths of autistic people in the workplace, based on reports from autistic people themselves. Due to the lack of existing literature on this topic, our study was exploratory in nature.

Methods

Participants

All participants were autistic adults (over 18 years). This included those with a formal diagnosis, those currently seeking a diagnosis and those who self-diagnosed as autistic. People who self-diagnosed were also included because for those not diagnosed in childhood, seeking a professional diagnosis in adulthood can be difficult, expensive and involve long waiting times, making it impractical or impossible for some[20]. Participants were required to have experience of paid and/or unpaid employment, so that they could draw on their lived experiences.

We recruited participants online through the authors' personal social media pages, the UCL Centre for Research in Autism and Education social media pages, and via online groups specifically for autistic people. Details of the study, along with a link to access the survey, were distributed as widely as possible via these channels.

Sample Demographics

In total 82 people engaged with the questionnaire. Of these, 66 people completed at least 50% of the survey and were therefore included in the analyses (individual *n* values are given for each variable). Most respondents were clinically diagnosed (77.3%) and female (n = 44, 66.7%) with similar numbers of male (n = 10, 15.2%) and non-binary (n = 12, 18.2%) participants. The age of respondents ranged from 19 to 67 years of age, with a mean age of 40 years. The majority of participants were based in the UK (n = 41, 62.1%) or the USA (n = 13, 19.7%) and were employed (n = 47, 71.2%) at the time of completing the survey (see Table 1 for full demographic information).

With respect to areas of employment, the most common sector was education, though a large number of participants had previous employment experience in the retail sector (see Table 1 for full list of employment areas).

Table 1

Participant Demographic Data (N=66)

Variable	Category	n	%
Gender	Female (including trans women)	44	66.7
	Male (including trans men)	10	15.2
	Non-binary	12	18.2
Age	18-25	6	9.1
	26-35	18	27.3
	36-45	20	30.3
	46-55	15	22.7
	56-65	6	9.1
	66-75	1	1.5
Location	United Kingdom	41	62.1
	United States of America	13	19.7
	Australia	2	3.0
	Germany	2	3.0
	Ireland	2	3.0
	Malta	1	1.5
	Sweden	1	1.5
	Rather not say	4	6.1
Autism Diagnosis	Clinically diagnosed	51	77.3
	Self-diagnosed	8	12.1
	In the process of seeking diagnosis	7	10.6
Employment Status	Currently employed	37	56.1
	Self-employed	10	15.1
	Not currently employed	19	28.8
Payment Status (for those in employment)	Paid	44	93.6
	Unpaid	3	6.4
Most common current employment sectors*	Education	15	22.7
	Research	6	9.1
	Administration	5	7.6
	Medicine	4	6.1
	IT	4	6.1
	Care/support work	3	4.5
	Manual labour	3	4.5
	Animal care	3	4.5
	Retail	2	3.0
	Finance	2	3.0
	Psychology	2	3.0
	Photography	2	3.0
	Hospitality	2	3.0
	Childcare	1	1.5
	Police/security	1	1.5

Most common previous employment sectors*	Education	19	28.8
	Customer service	19	28.8
	Retail	17	25.8
	Administration	10	15.2
	Civil service	10	15.2
	Research	9	13.6
	Management	9	13.6
	Finance	7	10.6
	Medicine	7	10.6
	Library assistant	7	10.6
	Childcare	6	9.1
	Care/support work	5	7.6
	Manual labour	5	7.6
	Police/security	4	6.1
	Management	4	6.1
	Animal care	3	4.5
	Psychology	3	4.5
	Photography	3	4.5
	Library assistant	3	4.5
	Journalism	2	3.0
	Hospitality	2	3.0
	IT	2	3.0
	Journalism	2	3.0

*Participants could report more than one sector, therefore percentages total over 100.

Measures

We used a bespoke questionnaire, designed specifically for the present study. The questionnaire comprised two sections, and used a combination of Likert-style, multiple choice and open-text questions.

Part 1 included demographic questions: e.g. age, gender, diagnoses. Part 2 asked participants about their current area of employment. They were also presented with an open text box to describe the strengths they felt were associated with being autistic in their workplace (providing examples in their current role where they felt these traits had helped them to out-perform their non-autistic colleagues). Participants could also opt to discuss their strengths in relation to previous job roles.

Before embarking on data collection, we sent the questionnaire to three people who met the inclusion criteria and who agreed to give feedback. As a result of this piloting, two questions were reworded, a minor spelling error was amended, and an error in the questionnaire flow was corrected (see Supplementary Materials for full questionnaire details).

Procedure

We administered the questionnaire via the online survey platform Qualtrics[21] and it took approximately 15 minutes to complete. We received ethical approval for the project via the Department of Psychology and Human Development at UCL Institute of Education. Although there were minimal risks associated with this study, we adhered to the British Psychological Society Code of Human Research Ethics[22] and guidelines for Internet-Mediated Research (IMR)[23]. All participants completed digital consent forms before taking part in the questionnaire.

Data Analysis

We used the IBM SPSS statistics package[24] to calculate descriptive statistics for the responses to the closed-ended questions in the survey.

To analyse the qualitative data (from open-ended questions), we used thematic analysis[25]. We used a latent approach, which attempts to interpret the data beyond what has been written, to 'theorize the significance of the patterns and their broader meanings and implications'[25] (p.84), relating findings to previous literature.

The first author (RC) collated the responses and, from initial readings of the document, identified a number of initial categories and themes. The process of thematic analysis was initially deductive: RC began the coding with categories in mind, based on the areas of strength identified by previous research. We also took an inductive approach, however, where additional codes were generated that were driven by the data. RC coded the data to identify each subtheme, which were then organised into master themes. During the reviewing, defining and naming process, the authors took steps to remain reflexive; to minimise the impact of authors' own experiences on the interpretations of the data. The varying neurotypes of the coders meant that we were able to check each other's interpretations to ensure that codes remained true to the content of the participants' responses. The authors subscribe to a neurodiversity framework and have prior involvement in autistic advocacy, employment initiatives for autistic people and research on autistic strengths and abilities. Importantly, RC is autistic and led the coding, thereby bringing a lived-experience perspective to the process. The second author (AR) and a second non-autistic coder (who supported aspects of the analysis) independently identified themes from the data and any minor discrepancies were resolved by discussion based on specific examples from the data. Following peer review, a small number of themes were further refined/modified.

Results

We identified five themes (and associated sub-themes) from the qualitative data (see Figure 1, and see Supplementary Materials for more example quotes for each theme and subtheme). All themes and subthemes were found in participant responses to the questions about current and past jobs, so themes are presented here together.

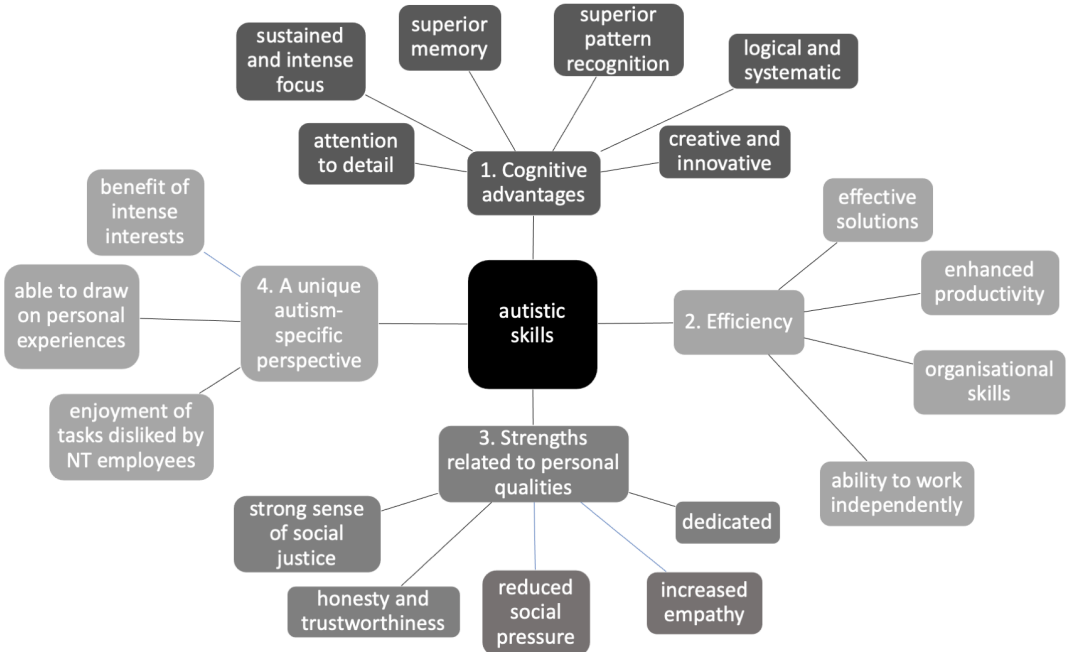

Figure 1: Diagram of themes and subthemes

Theme 1: Cognitive Advantages

Autistic participants reported a number of cognitive advantages. First, they spoke of ***excellent attention to detail***: "Because of my very strong focus on small details I am able to provide a consistently high standard of work for my clients (sewing machinist)*".* One participant explained how, as a researcher, their attention to detail helped them outperform NT colleagues:

> *On this and previous jobs, I have repeatedly 'fired' (presumably) NT colleagues or students from these tasks (i.e. reallocating their time and help elsewhere!) because they just cannot do them at a usable level of accuracy and detail despite extensive training. I find the exacting detail and procedure to be very easy to understand; my colleagues obviously don't (researcher).*

This excellent attention to detail allowed some participants to spot errors that others may have missed. One participant explained how this helped them to proof-read more accurately than NT colleagues as they were good at "picking up errors that others miss e.g. in a book editing, one half came out perfect, the other (which I didn't handle) full of errors" (former sub-editor). Several participants noted that ***superior pattern recognition*** skills gave them a similar advantage: "[I can] see patterns in data to come up with better systems" *(lecturer).*

Many of the participants in this study identified being able to work ***logically and systematically*** as a strength related to being autistic. One participant explained how they had an exceptional ability to systematically conduct literature reviews from a vast selection of library books: "*This was one of the happiest two weeks of my life, I think. To be confronted with such a huge system of knowledge and to systematically characterise a part of it, in almost complete silence" (former research assistant).* Many participants noted the ability to show a ***sustained and intense focus***, often suggesting it helped them to outperform their NT colleagues who did not have this ability:

> *Hyperfocus often helps, once I've got interested in a topic or task. This works well for research, when I can happily read or think about a topic for hours, days…I definitely experience flow states when thinking like this more than my non-autistic colleagues (researcher/lecturer).*

This increased attentional ability also led to increased reliability in the workplace: "*I can maintain quality on repetitive tasks which need 100% concentration (e.g. grading) more than most of my colleagues" (Teacher).* Participants also reported ***superior memory skills***, which allowed them to retain a great deal of information.

In addition to more logical and systematic strengths, participants also reported ***creativity and innovation*** as strengths associated with their autism. Several participants worked in creative industries and noted that their autism made them more creative or able to come up with different and 'quirky' designs. Strengths related to creativity and 'thinking outside the box' were also commonly reported amongst those in caring professions: "*[Autistic people] are famous for our ability to think outside the box. When it comes to solving conflicts this enables us to come up with often unconventional ideas …" (childcare worker).*

Theme 2: efficiency

In addition, participants felt they performed tasks more ***efficiently*** than their NT colleagues: "*I am very good at workflow efficiency and figuring out how to do new things rapidly (former mechanic).* Key to this efficiency, were ***increased accuracy*** (*"[I] spotted several typos on a webpage that colleagues had missed" (Civil Servant)),* ***enhanced productivity*** *(quicker or more productive at tasks on conveyor belt (Manual Labourer))* and ***excellent organisational skills***: "*In my lab, we need to do a lot of very complicated planning, organizing people, procedures equipment, schedules…I can do and keep track of most of this in my head, and my colleagues definitely cannot" (scientific researcher).* Together, these

allowed many of our participants to come up with more ***effective solutions*** that their neurotypical colleagues: "*[I am good at] getting things done more quickly than a drawn-out approach whereby something is 'answered' without being answered, and crops up again later, but worse" (Administrative Worker)*. Respondents also credited their ***ability to work independently***.

Theme 3: personal qualities

Many participants identified personal qualities, which they associated with their autism and felt were advantageous in the workplace. First, many reported being ***honest*** and having a ***strong sense of social justice and fairness***. For example, participants noted:

> *In situations where something seriously wrong was happening, I was the one to speak up about it (former prison officer).*

In many examples, the participants had noticed something which they believed was wrong and had spoken out where their NT colleagues had not. This led to various changes being implemented that improved outcomes for people they were working with.

One participant explained:

> *I have a strong sense of right and wrong and if I am asked to cover up something untoward I refuse (police officer).*

However, this participant (alongside several others) suggested that, although they perceived their honesty as a strength, their employers and/or colleagues (particularly those in senior management) did not always agree, which sometimes led to conflict. Nevertheless, many participants did feel that they had personal qualities related to their autism which benefitted them greatly in the workplace.

Participants also reported being ***extremely dedicated*** to their work, with a strong work ethic and genuine passion for their work. For example, one participant noted:

> *It is more important to me than to my neurotypical colleagues to ensure that all data is 100% transferred and accurate and that all processes and actions are documented thoroughly (university admin officer).*

A number of participants alluded to the benefits of being less socially-focussed than their non-autistic colleagues and explained how this ***reduced social pressure*** allowed them to excel in the workplace. For example, some highlighted their enhanced objectivity: *"I would*

say I am less susceptible to group think when being asked for an opinion about something" (policy development). For others, the reduced social emphasis led to greater efficiency: "*Disinterest in small talk & general self-promotion leads to greater productivity" (Administrator).*

Participants also noted that being autistic gave them ***increased empathy*** when working with other autistic or disabled people**,** or others who were deemed somehow 'different' compared to societal norms. Several participants in the present study explained how they felt this benefitted them in their roles: "*I tend to do very well with creating a safe space for people [who] for some reason are misfits" (learning support assistant, transcultural counsellor).*

Theme 4: A unique perspective

Our participants remarked on the unique perspective that being autistic allowed them to take. For example, the ***ability to draw on personal experiences*** enabled them to help others in a similar situation. One participant, a teacher working with d/Deaf students, explained how being autistic helped them to engage with their students:

> *[I am good at] bridging the gap between Deaf and hearing communities – I understand both and can effectively mediate and adjust language use (Autistic and Deaf mindsets/cultures are both very literal) (special education teacher).*

For this participant, their experience of being autistic helped them to adapt their teaching methods in a way which made sense to their students. These examples demonstrate how being able to reflect upon their own experiences as autistic people is useful in the workplace, particularly for those working in caring professions or education.

Several participants suggested that ***intense interests*** led to a desire to find out more about their area of work ("*Because teaching is a special interest, I am always trying to learn about ways to improve my teaching" (teacher)* and meant that they had a superior knowledge base compared to their NT colleagues, particularly in niche or under-researched areas: *"I write good, useful articles covering subjects no one else (maybe on the whole net) have written about" (former sub-editor).*

Similarly, some participants expressed a particular ***enjoyment or willingness to do jobs or perform tasks which NT employees may dislike***. For example, one participant, a university lecturer, explained how they enjoyed the repetitive nature of teaching the same course every year: "*Colleagues do not believe that I am v happy to still teach the first year intro course after 15 years doing it" (university lecturer).*

Discussion

The results of this study demonstrate that, based on the lived experiences of autistic people, there are many employment-related strengths that can be attributed to being on the autistic spectrum. These centred on cognitive skills (e.g. attentional superiorities), personal qualities (e.g. honesty and dedication) and the unique perspective that being autistic offered (e.g. empathy for those with differences).

Many of the skills map onto the cognitive strengths of autistic people reported in previous literature. For example, excellent attention to detail[17], superior pattern recognition[14] and being logical and systematic[26], have all been recognised as areas in which many autistic people excel. In the present study, we have shown how these skills are reflected in the workplace. Further, we found these advantages not only for participants employed in industries that have been traditionally associated with autistic employment (e.g. IT) but across a wide range of sectors (e.g. creative industries, hospitality etc). Likewise, the personal qualities shared in the present study have also been noted previously. Russell et al.[15] and Wong et al.[19] found that autistic people reported high levels of honesty outside and inside the workplace.

There were two areas of strength, however, that are inconsistent with much previous research. First, while many of our participants mentioned superior organisational skills, research has consistently suggested that autistic people often display deficits in executive functioning, which includes organisational abilities[14]. It is possible, then, that a lower degree of impairment in executive functioning is a mediating factor in the difficulties autistic people face regarding finding and maintaining employment. It would be interesting for future research to assess to what extent impairments (or lack of) in executive functioning are related to the ability of autistic people to access work.

Second, our results counter the concerning mis-characterisation that autistic people lack empathy. Contrary to the work of researchers such as Lombardo et al.,[27] who suggested that

autistic people have a reduced capacity for empathy, many participants in this study worked in caring professions and identified increased empathy as a strength associated with autism. This was particularly evident amongst those working with other autistic or disabled people as well as those who society might consider 'different'. This could be linked to the 'double empathy problem'[28], which suggests that autistic people struggle to empathise with non-autistic people (and vice versa) but that they are more effective than non-autistic people at empathising with fellow autistic people. This indicates the value in having autistic people working with others who experience similar challenges. Indeed, much recent research – together with first-hand accounts from those with lived experience – has undermined the suggestion that empathy is reduced in autistic people. Instead, evidence for a heightened empathic response has been noted whereby autistic people experience more intense, all-encompassing empathy than non-autistic people[29]. Further, it has been noted that the measures used to characterise empathy in previous research are unsuitable for use with the autistic population[30].

There was great consistency between our findings and those of Russell et al.,[15]: all the skills described by their participants when reflected on daily life in general were also reflected by our participants when considering their workplace experiences. In addition, those who took part in our study remarked on the value of holding different preferences and viewpoints to their neurotypical colleagues. For example, in the way this allowed them to successfully complete tasks that non-autistic employees were not able to, or did not wish to engage with. While it would be unethical for employers to assume that their autistic employees would be willing to undertake tasks others dislike without asking them first, our findings highlight the importance for autistic people to have access to specific careers support to help them identify what kind of work they would enjoy whilst making good use of their strengths. This was echoed by a number of our participants who discussed the positive outcomes when working in an area linked to their intense interests. Wehman et al.[31] describe a detailed assessment process for autistic people looking to find work, involving interviews, observations and situational assessments whereby a support worker would observe the jobseeker whilst they tried out a number of different jobs in different workplaces. Once the person was employed in a suitable job, employment specialists would help them to develop strategies to cope with the workplace, such as creating a visual timetable and writing short scripts for common workplace interactions. It is interesting that 72.2% of jobs found were classed as 'customised employment', whereby the employer created a job specification for an

individual worker rather than fill an existing vacancy. Although exact figures are not given, they found that the majority of participants were able to retain their jobs for over a year. Similarly, some evidence for the value of special interests in the workplace (both in terms of providing comfort to the autistic employee, and with respect to career success) was reported by a small group of employed autistic people in Switzerland[32].

While we welcome the growing emphasis on autistic employment within the research literature in recent years, there remain only limited studies which focus on workplace skills and abilities[33]. In addition, this work has been criticised as potentially perpetuating a stereotype – albeit positive – that can undermine the heterogeneity of the autistic population and the diverse strengths, challenges and support needs that may accompany this diversity[34]. Our study aimed to highlight the individual, first-hand, experiences of autistic employees' advantages in the workplace. While some of the skills reported by our participants map onto those previously reported (e.g. non-social superiorities reported by employers[35] and autistic people themselves[36]), those who took part in our study spoke about a wide range of additional strengths related to their personal qualities and social skills.

Limitations of the Work

This report is the first study to examine strengths from the autistic perspective specifically in relation to employment. We must acknowledge, however, the exploratory nature of our study and the limitations of our work.

First, we note the limitations of the participant group and, consequently, how far the findings can be generalised. Our study, by nature of collecting data via an online questionnaire, required a certain level of cognitive ability and may not, therefore, have been accessible to autistic people with intellectual disability (ID) or other language/communicative difficulties. Subsequent research should examine the views of autistic people with ID with regard to skills in the workplace. Our participant group was also predominantly female, despite rates of autism diagnoses remaining higher for men than for women. With respect to participant occupations, a large number worked in the education field. This may have been due to the networks we used to distribute our survey (as both authors are within the education field themselves) and might have resulted in this increased recruitment of female participants (women are over-represented in the teaching professions). This difference between the demographics of our participant group and the demographics of the wider autistic population

should be taken into account when considering the generalisability of our findings. Despite this, the consistency of our findings with anecdotal accounts of strengths experienced by those in technology-based sectors (who were not well-represented in the current study) reinforce the validity of our results[37]. It is possible, however, that the discrepancies between our work and previous studies (i.e. reports of superior executive function and empathy) may be gender-specific.

We also welcomed participants from any global location as we felt that the workplace strengths experienced by autistic adults were important to highlight, irrespective of location. As such, though most participants were from the UK, a fifth were from the USA and a small minority were from other Western countries. Given that experiences may differ for those in different countries due to socio-cultural factors related to both autism and employment, future studies should compare the experiences of autistic people across the world.

Further, while the majority of our participants reported being clinically-diagnosed as autistic, we chose to also include those who were self-diagnosed or in the process of seeking a clinical diagnosis. As noted above, we feel that this is important due to the barriers (cost, anxiety, limited access to services) that many people experience when pursuing an autism diagnosis[38]. We acknowledge, however, that the experiences of those with and without clinical diagnoses may be different.

Second, because our study focussed on skills that had been experienced in the workplace, we required participants to have experience of employment. Our findings, therefore, do not take into account the experiences of autistic people who have never had a job, which may account for up to 40% of autistic individuals[2]. It would therefore be valuable for similar research to be undertaken to ascertain what strengths might be relevant to autistic people without experience of employment and how these could be utilised to help people access work.

Third, the present work was limited to consideration of positive aspects of being on the autistic spectrum, yet we know that many autistic differences can be both an advantage and a challenge – depending on the situation[15]. As such, there is likely to be a complex interplay between a person's autism-related strengths and associated challenges. For example, several participants mentioned being able to perform repetitive manual tasks quickly and effectively, which might suggest they would be well-suited to working in a factory. However, autistic people often experience sensitivity to sensory input such as noise, bright lights and

busy environments[39]. A factory will inevitably involve many of these sensory challenges, making it difficult for an autistic person to utilise their strengths there. Future research should consider in more depth this nuanced impact of autistic traits within the workplace.

Lastly, our results are based on self-reported strengths and abilities rather than independent observations or assessments, and therefore reflect perceptions that are inevitably subjective. Our aim with this study, however, was to understand autistic people's own perceptions of their strengths in the workplace, rather than quantitatively measuring performance or reporting on what others may perceive about autistic employees.

Conclusion

Overall, our research suggest that employers would be wise to consider how they can support autistic employees to utilise their strengths in a workplace context: benefiting both the employers and their autistic employees. We hope that this study will also have a positive impact on autistic people who may, by reading these findings, be able to spot some of these strengths in themselves. Identifying their own strengths, with support where necessary, may help autistic people to make decisions about what employment might be right for them and to recognise the immense value which they can bring to the workplace. The findings may also help those working with autistic people as they prepare for employment, to help autistic people identify their own unique strengths which can be applied to the workplace.

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Author Contribution Statement

RC and AR contributed to the study concept and developed the survey questions. RC led participant recruitment, designed the online questionnaires, extracted the data. RC and AR conducted data analysis. RC and AR drafted the manuscript.

Both authors have reviewed and approved this manuscript prior to submission. This manuscript has been submitted solely to this journal and is not published, in press, or submitted elsewhere.

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References

1. Office for National Statistics. (2021). *Outcomes for disabled people in the UK - Office for National Statistics*. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/disability/articles/outcomesfordisabledpeopleintheuk/2020
2. National Autistic Society (2016). *The autism employment gap: Too Much Information in the workplace.* Available at https://www.autism.org.uk/what-we-do/news/government-must-tackle-the-autism-employment-gap
3. Ullman, M.T. & Pullman, M.Y. (2015). A compensatory role for declarative memory in neurodevelopmental disorders. *Neuroscience and Biobehavioral Reviews*, 51: 205-222. DOI: 10.1016/j.neubiorev.2015.01.008.
4. Camm-Crosbie, L., Bradley, L., Shaw, R., Baron-Cohen, S. & Cassidy, S. (2018). 'People like me don't get support': Autistic adults' experiences of support and treatment for mental health difficulties, self-injury and suicidality. *Autism,* 23(6): 1431–1441. DOI: 10.1177/1362361318816053
5. Weiss, J. & Fardella, M.A. (2018). Victimization and perpetration experiences of adults with autism. *Frontiers in Psychiatry.* 9: 1-10. DOI: 10.3389/fpsyt.2018.00203
6. Hendricks, D. (2010). Employment and adults with autism spectrum disorders: Challenges and strategies for success. *Journal of Vocational Rehabilitation,* 32: 125-134. DOI: 10.3233/JVR-2010-0502
7. Singer, J. (2017). NeuroDiversity: The birth of an idea. n.p.: Judy Singer.
8. Johnson T. & Joshi, A. (2014). Disclosure on the autism spectrum: Understanding disclosure among employees on the autism spectrum. *Ind Organ Psychol.,* 7(2): 278–281.
9. Flower R, Dickens L, Hedley D. (2019). Barriers to employment for individuals with autism spectrum disorder: Perceptions of autistic and non-autistic job candidates during a simulated job interview. *J Intellect Disabil Res.,* 63(7): 652.
10. den Houting J. Neurodiversity: An insider's perspective. *Autism*. 2019;23(2):271-273. doi:10.1177/1362361318820762
11. Wing, L. (1996). *The Autistic Spectrum*. London: Robinson.
12. Treffert, D.A. (2009). The savant syndrome: an extraordinary condition. A synopsis: past, present, future. *Philosophical Transactions of the Royal Society*, 364(1522): 1351–1357. DOI:10.1098/rstb.2008.0326
13. Mottron, L., Dawson, M., Soulières, I., Hubert, B. & Burack, J. (2006). Enhanced perceptual functioning in autism: an update, and eight principles of autistic perception.

Journal of Autism and Developmental Disorders. 36(1): 27-43. DOI: 10.1007/s10803-005-0040-7

14. Atwood, T. (2015). *The Complete Guide to Asperger's Syndrome*. London: Jessica Kingsley Publishers.
15. Russell, G., Kapp, S.K., Elliott, D., Elphick, C., Gwernan-Jones, R. & Owens, C. (2019). Mapping the autistic advantage from the accounts of adults diagnosed with autism: a qualitative study. *Autism in Adulthood,* 1(2). DOI: 10.1089/aut.2018.0035
16. Silberman, S. (2001). *The Geek Syndrome.* Available at https://www.wired.com/2001/12/aspergers/
17. Scott, M., Milbourn, B., Falkmer, M., Black, M., Bölte, S. … Girdler, S. (2019). Factors impacting employment for people with autism spectrum disorder: a scoping review. *Autism,* 23(4), 869–901. DOI:10.1177/1362361318787789
18. Charlton, J.I. (1998). *Nothing About Us Without Us: Disability Oppression and Empowerment.* Berkley: University of California Press.
19. Wong, P.S., Donelly, M., Neck, P.A. & Boyd, B. (2018). Positive Autism: investigation of workplace characteristics leading to a strengths-based approach to employment of people with autism. *Revista de Management Comparat International,* 19(1): 15-30. DOI: 10.24818/RMCI.2018.1.15
20. Sarrett, J.C. (2016). Biocertification and Neurodiversity: the role and implications of self-diagnosis in autistic communities. *Neuroethics,* 9:23–36. DOI: 10.1007/s12152-016-9247-x
21. Qualtrics. (2019). Qualtrics Version 1.31.1. Provo, Utah: Qualtrics LLC.
22. British Psychological Society (2014). *Code of Human Research Ethics*. Available at https://www.bps.org.uk/news-and-policy/bps-code-human-research-ethics-2nd-edition-2014
23. British Psychological Society (2017). *Ethics Guidelines for Internet-mediated Research.* Available at https://www.bps.org.uk/news-and-policy/ethics-guidelines-internet-mediated-research-2017
24. IBM (2019). *SPSS Statistics 26 for Windows User's Guide*. Chicago, IL: SPSS, Inc.
25. Braun, V. & Clarke, V. (2008). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. DOI: 10.1191/1478088706qp063oa
26. Baron-Cohen, S., Ashwin, E., Ashwin, C., Tavassoli, T. & Chakrabati, B. (2009). Talent in autism: hyper-systemizing, hyper-attention to detail and sensory hypersensitivity.

Philosophical transactions of the Royal Society of London. Series B, Biological sciences, 364(1522): 1377-1383. DOI: 10.1098/rstb.2008.0337

27. Lombardo, M.V., Barnes, J.L., Wheelwright, S.J. & Baron-Cohen, S. (2007). Self-referential cognition and empathy in autism. *PLoS ONE*, 2(9): e883. DOI: 10.1371/journal.pone.0000883
28. Milton, D.E.M. (2012). On the ontological status of autism: the 'double empathy problem'. *Disability and Society,* 27(6): 883-887. DOI: 10.1080/09687599.2012.710008
29. Fletcher-Watson, S., & Bird, G. (2020). Autism and empathy: What are the real links? *Autism*, *24*(1), 3–6. https://doi.org/10.1177/1362361319883506
30. Harrison, J. L., Brownlow, C. L., Ireland, M. J., & Piovesana, A. M. (2020). Empathy Measurement in Autistic and Nonautistic Adults: A COSMIN Systematic Literature Review. *Assessment*. https://doi.org/10.1177/1073191120964564
31. Wehman, P., Brooke, V., Brooke, A.M., Ham, W., Schall, C. … Avellone, L. (2016). Employment for adults with autism spectrum disorders: A retrospective review of a customized employment approach. *Research in Developmental Disabilities*, 53-54: 61-72. DOI: 10.1016/j.ridd.2016.01.015
32. Krieger, B., Kinebanian, A., Prodinger, B., & Heigl, F. (2012). Becoming a member of the work force: Perceptions of adults with Asperger Syndrome. *Work*, *43*(2), 141-157.
33. Bury, S. M., Hedley, D., Uljarević, M., & Gal, E. (2020). The autism advantage at work: A critical and systematic review of current evidence. *Research in Developmental Disabilities*, *105*, 103750.
34. Bury, S. M., Hedley, D., Uljarević, M., Dissanayake, C., & Gal, E. (2019). If you've employed one person with autism …: An individual difference approach to the autism advantage at work. *Autism*, *23*(6), 1607-1608. https://doi.org/10.1177/1362361318794937
35. Scott M, Jacob A, Hendrie D, Parsons R, Girdler S, Falkmer T, et al. (2017) Employers' perception of the costs and the benefits of hiring individuals with autism spectrum disorder in open employment in Australia. PLoS ONE 12(5): e0177607. https://doi.org/10.1371/journal.pone.0177607
36. Smith, R. S., & Sharp, J. (2013). Fascination and isolation: A grounded theory exploration of unusual sensory experiences in adults with Asperger syndrome. *Journal of autism and developmental disorders*, *43*(4), 891-910.
37. Auticon (2019). *Understanding the cognitive benefits of autism in the technology field.* Available at: https://auticon.com/cognitive-benefits-of-autism-in-the-technology-field/

38. Lewis, L.F. A Mixed Methods Study of Barriers to Formal Diagnosis of Autism Spectrum Disorder in Adults. *J Autism Dev Disord* **47,** 2410–2424 (2017). https://doi.org/10.1007/s10803-017-3168-3
39. American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders: DSM-5*. DOI: 10.1176/appi.books.9780890425596.dsm01

Supplementary Materials

Table of Themes for Autistic Strengths

Themes	Sub-themes	Illustrative Quotes
1. Cognitive advantages	*1.1 Excellent attention to detail*	*I can notice very subtle changes in my environment. As I work with animals, I can see if one of them isn't well or has an injury even if they are only showing slight symptoms. (Zoo keeper)*
		Spotted several typos on a webpage that colleagues had missed. (Civil Servant)
		All marking gets checked and there's a running joke about how rare it is to find an error in mine. (Professor)
	1.2 Superior pattern recognition	*Pattern spotting and logic allows identification of errors and inconsistencies. (IT worker)*
		I'm also able to notice subtle patterns or light changes, and a variety of other things that most people miss. (Photographer)
	1.3 Logical and systematic	*This was one of the happiest two weeks of my life, I think. To be confronted with such a huge system of knowledge and to systematically characterise a part of it, in almost complete silence. I miss it. (former research assistant)*
	1.4 Sustained and intense focus	*Hyperfocus often helps, once I've got interested in a topic or task. This works well for research, when I can happily read or think about a topic for hours, days…I definitely experience flow states when thinking like this more than my non-autistic colleagues.(Researcher/lecturer)*
		I don't get bored of the routine or mundane tasks. (Animal Care)
		I can maintain quality on repetitive tasks which need 100% concentration (e.g. grading) more than most of my colleagues. (Teacher)
	1.5 Creativity and innovation	*I am creative, using tools available in original ways. (Doctor)*
	1.6 Superior memory	*Ability to easily remember a lot of information. (Administative Assistant)*
		Very accurate long-term memory. (Physical Therapist)

2. Efficiency	*2.1 Effective solutions*	*[I am good at] getting things done more quickly than a drawn-out approach whereby something is 'answered' without being answered, and crops up again later, but worse. (Administrative Worker)*
		I can find the minimal but sufficient action to solve such problems without doing something more drastic. (Analyst)
	2.2 Enhanced productivity	*Quicker or more productive at tasks on conveyor belt (Manual Labourer)*
	2.3 organisational skills	*[I have a] genuine enjoyment for tasks that require organisation and will do them to an incredible level of precision. (Member of gym staff)*
	2.4 Ability to work independently	*I can work independently. (Broker, lecturer)*
		Good at working independently and managing my own workload. (Steward and tutor)
3. Personal qualities	*3.1 strong sense of social justice and fairness*	*In situations where something seriously wrong was happening, I was the one to speak up about it. (Former prison officer)*
		My thoroughness and willingness to speak out led to changes in the way residents were engaged with and listened to, as their complaints had previously been dismissed. (Resident representative in a care home)
		I am not obsessed by the need to be popular with my colleagues so I am able to do the right thing even if it causes difficulties for me. (Civil Servant)
		I have a strong sense of right and wrong and if I am asked to cover up something seriously untoward I refuse. (Former police officer)
	3.2 honesty	*[I am] very honest. (Financial Consultant)*
	3.3 dedicated	*I think I have more passion and staying power to see projects through. (Charity worker)*
		I am most probably most stubborn than my colleagues so I will not give up when I have a problem. (Software Consultant)
	3.4 reduced social pressure	*I would say I am less susceptible to group think when being asked for an opinion about something. (Policy Development)*

		I don't get caught up in lengthy non work-related conversations. (Policy Development)
		Disinterest in small talk & general self-promotion leads to greater productivity. (Administrator)
		Ruthless objectivity. (Civil Servant)
	3.5 increased empathy, in particular for other disabled people	*"[I am] very concerned with the feelings of my students, especially students that may not fit in. (Teacher)*
		I can design user interfaces well as I can empathise strongly (Ranger)
4. A unique perspective	*4.1 ability to draw on personal experiences*	*I could easily pick out phrases the student would likely struggle with, usually metaphors/idioms/figures of speech; because I had had to consciously learn their meaning and translate to a literal mindset, it meant that I could then explain the phrase's meaning to the student in a way they would understand. (Special education teacher)*
		[I am good at] bridging the gap between Deaf and hearing communities – I understand both and can effectively mediate and adjust language use (Autistic and Deaf mindsets/cultures are both very literal). (Special education teacher)
		The "normal teacher" has almost no idea what autistic students need, what their needs are and how to accommodate them. (Teaching assistant)
	4.2 The benefit of intense interests	*Because teaching is a special interest, I am always trying to learn about ways to improve my teaching. (Teacher)*
	4.3 Enjoyment of tasks disliked by NT employees	*Colleagues do not believe that I am v happy to still teach the first year intro course after 15 years doing it. (University lecturer)*