3-11-2024

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Recommended Citation

Griffiths, A. J., Torres, R., Delgado, R., Hurley-Hanson, A. E., Giannantonio, C. M., Walrod, W., Maupin, Z., & Brady, J. (2024). Understanding unique employability skill sets of autistic individuals: A systematic review. *Journal of Employment Counseling*, 1–31. https://doi.org/10.1002/joec.12223

Received: 28 August 2023 | Revised: 6 December 2023 | Accepted: 6 February 2024

DOI: 10.1002/joec.12223

ARTICLE

Understanding unique employability skill sets of autistic individuals: A systematic review

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Funding information
Thompson Policy Institute on Disability; Kay Family Foundation

Abstract
In recent years, several publications and media outlets have highlighted how the skills and interests of autistic individuals may benefit organizations. However, there is scant empirical research on the topic. The present study's authors conducted a systematic review to find which potential employability skills, strengths, and interests of autistic individuals available research has highlighted. Data extraction methods identified 51 papers related to skills in this population. The skill sets autistic individuals may possess and the research behind these findings were organized, evaluated, and summarized. Based on these findings, investigators discuss implications for employment counseling and future research.

KEYWORDS
autism, employability skills, inclusion

INTRODUCTION

In recent years, both mainstream media and scholarly publications have highlighted how the skills and interests of autistic individuals can benefit various professional organizations. While there has been a more widely publicized push to make workplaces more inclusive for employees with diverse abilities, autistic individuals have continued to face significantly higher unemployment rates compared to neurotypical adults (Baldwin et al., 2014; Krieger et al., 2012; Nord et al., 2016; Richards, 2012; Roux et al., 2013; Scott et al., 2015; Shattuck et al., 2012). Labor market data from the past several years also show that autistic individuals who obtain work experience have more difficulty sustaining long-term employment than their nondisabled colleagues (Baldwin et al., 2014; Lorenz & Heinitz, 2014; Richards, 2012; Roux et al., 2013). Based on these trends, it appears businesses are actively looking for ways to include neurodivergent populations in their workforce but may face challenges retaining autistic employees in the long term. Simultaneously, current labor market data and empirical studies also indicate that those with neurodevelopmental disabilities, such as autism, need improved access to stable employment. The authors would like to note that rather than adopt person-first language (i.e., a person with autism), they are utilizing the descriptor "autistic" as emerging international research indicates that autistic adults prefer identity-first language (Taboas, 2023).

Despite a vested interest among key stakeholders, little information is available on preparing for and promoting the employment of autistic youth and young adults. More specifically, the current literature base reflects minimal research regarding the most common and marketable skills of the autistic workforce. Employment counselors are well-positioned to support both workers and businesses in understanding how these skill sets uniquely situate autistic individuals to contribute meaningfully to the labor market.

Present research suggests that the nature of employment is rapidly changing. Most people will hold anywhere from 12 to 17 jobs throughout their careers (Australian Bureau of Statistics, 2016; US BLS, 2021) and, due to the advancement of technology and globalization, young adults are likely to hold jobs that do not yet exists (World Economic Forum, 2016). Concurrently, diversification of the modern workforce has become a priority for many industries, seeking applicants that will offer varying perspectives and skill sets (Cope & Remington, 2022; Gerwurtz et al., 2020). As the nature of work and priorities in hiring change, approaches to employment counseling continue to evolve. Employment counselors can build upon more traditional models such as trait-and-factor theory (Holland, 1985) and developmental approach (Super, 1953, 1980) by adopting more culturally sustaining orientations such as ecological career counseling (Cook et al., 2002) that consider the individual and contextual factors impacting prospective employees. With the information from this study, employment counselors can more effectively leverage the strengths of autistic populations and consider skill–job alignment in a more informed manner, further broadening access to vocational opportunities for neurodivergent populations.

For this project, the research team sought to identify common employability skills, strengths, and interests related to the potential career paths of autistic individuals and systematically reviewed the research behind these findings. By understanding which skills of those frequently associated with autistic individuals are in high demand, practitioners and researchers can enhance practices to support young autistic adults seeking sustainable employment in today's workforce. These findings also continue to substantiate the valuable role of the autistic workforce in today's evolving labor market, further justifying companies' efforts to take the necessary steps to diversify their workforce.

Summary of critical theories and models

Researchers have put forth several theories to explain the functioning of autistic individuals. Whether general or domain specific, these theories establish a profile of both strengths and weaknesses in autistic individuals. Key theories include weak central coherence, monotropism theory, systemizing theories, and the perceptual functioning model.

Happé and Frith (2006) originally conceptualized the weak central coherence theory as a deficit in central processing among autistic individuals. They have since modified this theory to emphasize superiority of detail-focused processing. Similarly, scholars now describe the global processing deficit as a bias toward local processing, which an individual can overcome when explicitly demanded (Happé & Frith, 2006).

In alignment with the weak central coherence theory, the monotropism theory, originating from the work of neurodivergent researchers, suggests that trademark characteristics of autism relate to an individual's ability to allocate attentional resources when processing information (Murray et al., 2005). According to this theory, autistic people tend to focus on specific areas of more interest to the individual. This way of thinking allows for intense processing in one area or subject. However, it can also make it challenging for autistic individuals to expand their scope of focus, process multiple pieces at once, or divert their attention between various tasks quickly (Murray et al., 2005).

The empathizing–systemizing (E–S) theory is a cognitive theory that aims to explain the features of autism (Baron-Cohen, 2009). The E–S theory describes the social difficulties in autism through deficits in empathy and identifies nonsocial strengths through skill in systemizing. Related literature defines systemizing as a drive to analyze or construct any kind of system. Individuals do this by identifying the system's rules to predict what will happen. Readers should note that recent research highlights mixed agreement regarding this theory, particularly characterizing autistic individuals as having a deficit in empathy (Hillary, 2020; Stenning, 2020). Similarly, the hypersystemizing theory describes how features of autism lead to systemizing talent, specifically, sensory hypersensitivity such as higher visual acuity, which allows for excellent attention to detail (Baron-Cohen et al., 2009).

The enhanced perceptual functioning model attempts to explain perception in autism. Authors of this model describe differences to neurotypical perception, including a bias toward more locally oriented perception, enhanced low-level discrimination, and enhanced perception of first-order static stimuli (Mottron et al., 2006). With empirical findings serving as the basis for these conclusions, the model describes increased brain activity in regions associated with visual perception as a possible explanation.

Although these theories provide some context for how autistic individuals may function in various settings, the available literature does not reflect a clear understanding of the skills that autistic individuals bring to employment settings and how this may provide an advantage in particular fields.

Current study

Despite limited research, popular media and theories suggest autistic individuals possess particular skills and interests that can lead to meaningful employment. The present review aims to systematically gather, for the first time, empirical data regarding strengths, employability skills, and career interests of autistic individuals. The investigators sought to answer the following question: What relationships exist, if any, between autism and employment skills and specific career interests?

METHOD

Search strategy

The research team searched three databases, including ProQuest, PsycINFO, and PubMed, for studies published from 2012 to 2022 to capture relevant and contemporary research. The search aimed to identify studies documenting the strengths, employability skills, and career interests associated with autistic individuals.

Under the "Advanced Search" and the "All Text" option, the team initially searched broadly using the following Boolean/phrases: Autism Spectrum Disorders OR ASD OR Autism OR Asperger OR High-Functioning Autism OR HFA OR PDD-NOS AND career skills OR employment skills OR career interests OR strengths OR advantages. This returned 17,993 articles. During the screening process, two independent reviewers screened titles, abstracts, and full texts for eligibility. A priori inclusion criteria were English-language articles published in peer-reviewed journals describing or conducting empirical research about the strengths, skills, and career interests of children, adolescents, or adults identified as autistic.

Study selection

To ensure that the research team included as many relevant articles as possible, they took another step in searching for applicable publications. Using articles identified in the original pool and other nonacademic searches of strengths commonly associated with autism, the team created a list of possible skills and searched the three databases for studies related to each individual skill. This search yielded a total of 23,229 potential articles. Reviewers also hand-searched the reference lists of the papers initially selected. This process led investigators to include relevant articles from years published outside of the initial search limits. Since the goal of this review was to identify strengths in autism, investigators focused on skills that were specific to autistic individuals. The team excluded studies with no autistic sample, studies focused on solely deficits and not strengths, and those reporting indirect links between autism and skills, such as the occupations of family members of autistic individuals.

Given the many articles retrieved, the team used an abstract screening tool based on guidelines created by Polanin et al. (2019). Reviewers stored relevant articles in a shared drive, discarding duplicates, and independently checked every article to ensure they met inclusion criteria.

Data collection for this study began before the publication of the PRISMA 2020 guidelines. Therefore, researchers used aspects of the PRISMA 2009 and 2020 Checklist (Moher et al., 2009; Page et al., 2021) as a guide. For example, the study selection flow chart is based on the 2009 PRISMA guidelines, as the team collected data using this format prior to the updated guidelines. They did not utilize certain items in the results section of the checklist. Specifically, the authors used a thematic analysis to identify themes or skill sets that are commonly associated with this population. The results of this thematic analysis are presented and summarized in Table 1. Figure 1 outlines the number of papers identified, reviewed, excluded, and included. The full sample included 51 papers.

Data extraction

The research team extracted and tabulated data from the included papers by identifying the sample size, setting/subjects, methods, objectives, and results. Investigators then summarized potential key skills for each publication to assist with analysis.

Analysis plan

Once the research team finalized the included studies, the primary investigator entered information from each paper into the table, other research team members reviewed the information for accuracy, and the team analyzed the data for common constructs. The included studies measured different concepts and were methodologically heterogeneous. Therefore, the research team analyzed the data using a narrative approach. The reviewers independently identified themes from each eligible paper using a standardized table with detailed instructions. They coded, summarized, and categorized each study by skill. Reviewers then compared tables and notes and resolved disagreements through discussion or, if required, adjudication by a third reviewer. Finally, reviewers created a table with the common skills and a summary definition of that skill or construct. Once again, two independent reviewers reviewed each paper to determine whether the skill or construct was present or assumed in the paper. Each reviewer tabulated these data, compared results, resolved disagreements, and created a final table for all papers, which the authors discuss further in Section 3.

TABLE 1 Thematic analysis results.

#	Study; location	Participants	Results	Skills identified
1	Annabi et al. (2017); New York, NY	Review of theories and comparison of findings to skills needed for software developers	Links the hypersystemizing profile and analytical strengths to being especially suitable for software development	Systemizing (attention to detail within systems) Information processing Specialization of interests
2	Ashwin et al. (2017); Cambridge, UK	Autism spectrum disorder (ASD): 22 adult males; mean age: 32.7 years (SD = 11.7, range: 19–57) Had diagnosis meeting APA/WHO criteria from a professional (DSM-4-TR and ICD-10) Typically Developing (TD): 22 adult males; mean age: 32.1 years (SD = 11.6, range: 20–61)	Adults with had reduced change blindness for changes to items of marginal interest; no group difference for items of central interest. ASD group experienced greater change blindness to changes of location of marginal interest items.	Attention to detail—reduced change blindness
3	Ashwin et al. (2009); Cambridge, UK	ASD: 15 adult males; mean age: 38.93 years (SD = 14.42, range: 22–62) Had diagnosis (of Asperger's) from professional clinician, asked to show documentary evidence of diagnosis to take part (DSM 4) TD: 15 adult males; mean age: 27.60 years (SD = 11.52, range: 19–63)	ASD group had significantly better visual acuity (20:7) compared to control (20:13) on the Freiburg Visual Acuity and Contrast Test.	Visual acuity
4	Baron-Cohen et al. (2003); Cambridge, UK	Study 2: ASD: 47 adults (33 males, 14 females); mean age: 38.1 years (SD = 13.3) Had DSM diagnosis of ASD by psychiatrists TD: 47 adults (32 males, 15 females); mean age: 36.5 years (SD = 13.2)	ASD group scored significantly higher on the systemizing quotient (SQ) and significantly lower on the empathizing quotient (EQ) than controls.	Systemizing
5	Baron-Cohen et al. (2007); Cambridge, UK	792 Cambridge University students: 378 mathematics majors—74.1% male 414 control majors (medicine, law, social science)—39.4% male Groups matched for age, parental occupation, and handedness Anyone reporting an ASD diagnosis was contacted to confirm it was a diagnosis made by a clinical professional using established international criteria	Seven cases of autism in math group (1.85%) and one case in control group (0.24%) Seven cases of autism in immediate families of math group and two cases in families of control group	Math ability/interest

(Continues)

TABLE 1 (Continued)

#	Study; location	Participants	Results	Skills identified
6	Blaser et al. (2014); Boston, MA	Same data from Kaldy et al. (2011) reanalyzed	ASD toddlers' enhanced performance on visual tasks is due to focused attention. They were found to have exaggerated task-related pupil dilations.	Focused attention
7	Brosnan et al. (2014); Bath, UK	ASD: 20 adolescents (one female); recruited from ASD unit attached to a mainstream school, required clinical diagnosis to enroll TD: 23 adolescents (eight females); recruited from mainstream school All participants' age ranged from 13 to 17 years; Caucasian; drawn from suburban lower-middle class area	On jumping-to-conclusions beads task, ASD group required more beads than controls before making a decision. Both groups demonstrated equivalent levels of confidence.	Decision-making—a circumspect reasoning bias
8	Brosnan et al. (2012); Bath, UK	ASD: 13 adolescent males; mean age: 13.85 years (SD = 0.90, range: 12–15) Recruited from school unit for ASD, all had clinical diagnosis of ASD TD: 13 adolescent males; mean age: 14.69 years (SD = 0.75, range: 13–16)	ASD group showed significantly greater visual acuity, Embedded Figures Test (EFT) performance, and systemizing ability (using Intuitive Physics Test) Strongest relationship between visual acuity and EFT performance	Visual acuity EFT performance Systemizing ability
9	Brosnan et al. (2016); Bath, UK	Study 2: ASD: 17 males; mean age: 18.4 years (SD = 1.3, range: 17–21) Students attending ASD program that required evidence of clinical ASD diagnosis to enroll; confirmed with Social Communication Questionnaire and Ritvo Autism Asperger Diagnostic Scale—Revised TD: 18 males; mean age: 19.5 years (SD = 1.9, range: 16–21)	ASD group showed more deliberative and less intuitive responses on the Cognitive Reflection Task (CRT). ASD group self-reported significantly lower levels of intuition than the TD group using the Rational-Experiential Inventory-Short (REI-S).	Decision-making bias toward deliberation rather than intuition
10	Caldwell-Harris and Jordan (2014); Boston, MA	ASD: 70 participants (57.1% male); mean age: 29.2 years (SD = 12.5, range: 16–42) Self-reported as having an ASD, 58.6% reported being diagnosed by a clinician TD: 68 participants (49.6% male); mean age: 23.8 years (SD = 10.7, range: 15–59)	Individuals with ASD reported more intense interests in systemizable domains, relative to neurotypical adults.	Interest in systemizing

(Continues)

TABLE 1 (Continued)

#	Study; location	Participants	Results	Skills identified
11	Chen et al. (2022); Twin Cities, MI	Systematic review of 22 studies and meta-analysis ASD: 464 participants	Based on review, the small-to-medium effect size was identified indicating enhanced pitch perception among ASD participants.	Auditory perception
12	De Martino et al. (2008); London, UK	ASD: 14 participants (10 male); mean age: 34.8 years (SD = 7.9) Had diagnosis of ASD by clinician, additional Autism Diagnostic Observation Schedule (ADOS) assessment TD: 15 participants (11 male); mean age: 32.2 years (SD = 8.5)	ASD group showed reduced susceptibility to framing effect on a gambling task, possibly because not incorporating emotional context into decision-making process.	Decision-making—reduced susceptibility to framing effect/enhanced logical consistency
13	Fletcher-Watson et al. (2012); Northumberland, UK	ASD: 11 children (three female); mean age: 13 years (SD = 20 months, range: 11–16) Had best-estimate clinical diagnosis using ICD-10 TD children: 29 children; mean age: 11 years (SD = 10 months, range: 10–12) TD adults: 20 adults; mean age: 21 years (SD = 9 months, range: 19–22)	On change-blindness task, children with ASD were less accurate than TD groups for marginal changes, with no differences in central changes. Children with ASD were faster than TD children to detect marginal color and location and central presence/absence changes. They were faster than TD adults at detecting marginal color changes.	Attention—reduced change blindness in children with ASD Possible developmental crossover where this ability in childhood becomes deficit in adulthood because of previous findings in adults
14	Gonzalez et al. (2013); Pittsburgh, PA	ASD: 13 adult males; mean age: 27.6 years (SD = 8.59, range: 18–45) Diagnosis established using ADI, ADOS, and expert clinical opinion TD: 13 adult males; mean age: 28.5 years (SD = 6.29, range: 20–45)	ASD and TD groups equally accurate in detecting targets on naturalistic luggage screening visual search task ASD group improved in correct elimination of target-absent bags faster than controls	Visual search tasks that require sustained attention
15	Hagmann et al. (2016); Syracuse, NY	ASD: 16 children (five female); mean age: 11.6 years (SD = 2.5; range: 7.6–17) Met diagnostic cutoff on ADOS-2 and ADI-R administered by research reliable clinicians TD: 16 children (eight female); mean age: 11.4 years (SD = 2.5; range: 7.1–16.6) 37 adults (15 female); mean age: 19.3 years (SD = 1.33; range: 18–25.6)	Children with ASD were more accurate than TD children and the same as TD adults at the fastest rate on a color visual search task (but not a category visual search task).	Enhanced perception

(Continues)

TABLE 1 (Continued)

#	Study; location	Participants	Results	Skills identified
16	Happe and Frith (2006); London, UK	50+ empirical studies	ASD groups show superior performance on tasks requiring detail-focused processing.	Detail-focused processing (local bias)
17	Jolliffe and Baron-Cohen (1997); Cambridge, UK	ASD: 17 adults with language delay (HFA diagnosis); mean age: 30.71 years (SD = 7.84, range: 19–46) 17 adults without language delay (AS diagnosis); mean age: 27.77 years (SD = 7.81, range: 18–49) All fulfilled criteria for DSM-IV or ICD-10 TD: 17 adults; mean age: 30 years (SD = 9.12, range: 18–49) Sex ratio of all three groups 15:2	ASD groups significantly faster on the EFT No differences on Rey Figure task Hypotheses presented: Superior segmentation, superior on spatial tasks, lack of global precedence	Faster EFT performance Possibly because of superior segmentation or superior on spatial tasks
18	Jordan and Caldwell-Harris (2012); Boston, MA	ASD: 211 individuals (106 male, 105 female); mean age: 25.5 years (SD = 9.5, range: 14–72) 65% (*n* = 137) reported being diagnosed with ASD, 24% (*n* = 51) judged themselves to have AS, although they never received an official diagnosis, 11% (*n* = 23) reported not being sure whether they had an ASD TD: 213 individuals (68 male, 121 female, 24 unreported); mean age: 24.1 years (SD = 11.1, range: 14–41)	Based on internet forum posts, ASD group had more interests in systemizing domains (science most reported), more specific interests, and greater number of interests overall than TD group.	Systemizing domain interests
19	Joseph et al. (2009); United States	ASD: 21 children and adolescents (17 males); mean age: 14:7 years (SD = 2:8, range: 10:6–19:3) Judged to meet DSM-IV criteria by expert clinician (first author); clinical diagnoses confirmed using ADI-R and ADOS TD: 21 children and adolescents (17 males); mean age: 14:2 years (SD = 2:11, range: 8:6–19:1)	ASD group had faster reaction time on static and dynamic search tasks.	Enhanced discrimination
20	Kaldy et al. (2016); Boston, MA	Literature review of visual search studies Reinterpretation of from Kaldy et al. (2011)	ASD group had exaggerated task-related pupil dilations, evidence of a focused attentional state during visual search.	Attentional focus

(Continues)

TABLE 1 (Continued)

#	Study; location	Participants	Results	Skills identified
21	Kaldy et al. (2011); Boston, MA	ASD: 17 toddlers; mean age: 29.6 months (SD = 4.8, range: 21–35) Recruited through ASD intervention provider, diagnosis verified through ADOS and confirmed by co-author TD: 17 toddlers; mean age: 29.5 months (SD = 2.5, range: 25–34)	Toddlers with ASD were more successful at finding the target on visual search and did increasingly well as the set size increased.	Enhanced discrimination
22	Karmakar and Sarkar (2020); India	ASD: 47 children TD: 47 children (matched in age, gender, education-level with ASD sample	ASD group performed better on visual-search tests and performed comparably on visual working memory tests. Implications regarding strengths in visual observations skills and attention to detail	Visual search tasks
23	Keehn and Joseph (2016); West Lafayette, IN	ASD: 22 children and adolescents (16 males); mean age: 13.7 years (SD = 3, range: 9–20) Confirmed to meet DSM-5 criteria using ADI-R and ADOS TD: 30 children and adolescents (26 males); mean age: 13.5 years (SD = 2, range: 9–18)	ASD group faster at visual search Group differences did not vary with level of difficulty or selection. Instead, they were mainly the effect of faster performance on target-absent trials. Advantage may be due to lack of search symmetry.	Enhanced perceptual capacity/load
24	Kemner et al. (2008); Utrecht, the Netherlands	ASD: eight young adults with PDD (mean age: 22.1 years) Diagnosis made by child psychiatrist based on DSM-IV, parents also administered the ADI-R TD: eight young adults (mean age: 21.2 years)	ASD group significantly faster on visual search tasks No evidence found for different search strategy	Enhanced perceptual discrimination
25	Kirchner and Dziobek (2014); Berlin, Germany	ASD group only 76 adults (33 male, 43 female); mean age: 36.1 years (SD = 11.1, range: 19–60) Self-reported to have an official clinical diagnosis of ASD	Although special interests were reported to be in the social sciences and the creative fields as often as they were in the natural sciences and technology/engineering, the most common approach taken within those fields was systemizing rather than a creative or knowledge acquiring pursuit.	Systemizing interest/ability

(Continues)

TABLE 1 (Continued)

#	Study; location	Participants	Results	Skills identified
26	Kirchner et al. (2016); Berlin	ASD: 32 adults (21 male); mean age: 30.9 years (SD = 8.4) Recruited through autism outpatient clinic, diagnosed with ASD according to DSM-IV using ADOS and clinical interview TD: 32 matched (gender, age, education, and employment status) adults (20 male); mean age: 30.9 years (SD = 8.4)	On self-report questionnaire Values in Action Inventory of Strengths, creativity was more often a signature strength in ASD, while love and humor were significantly more often signature strengths in controls.	Creativity
27	Lorenz and Heinitz (2014); Berlin, Germany	ASD: 136 individuals with Asperger's (86 women, 46 men, four other); mean age = 35.54 years (SD = 10.59, range: 18–65) Existing diagnosis confirmed by cutoff score on AQ-10 TD: 155 individuals (91 women, 62 men, two other); mean age = 33.5 years (SD = 9.05, range: 18–60)	Distinct differences in strengths: ASD group reported more often a strength in: attention to detail, logical reasoning, focus, systemizing, consistency, visual skills, retentiveness, repetitive tasks, numbers; TD group reported more often a strength in: verbal skills, auditory skills, flexibility, social skills, multi-tasking, empathy, and teamwork	Attention to detail Logical reasoning Focus Systemizing Consistency Visual skills Retentiveness Repetitive tasks Numbers
28	Mazurek et al. (2012); Columbia, MO	NLTS2 data: 920 participants with ASD ASD group are students classified under autism for special education Most all members were ages 13–17 Info gathered through phone interviews	Solitary screen-based media use represents a primary and preferred activity for a large percentage of youths with ASD	Technology interest
29	Mazurek and Engelhardt (2013); Columbia, MO	ASD: parents of 56 boys; mean age: 11.7 years (SD = 2.6) Recruited through medical center specializing in ASD, all had previous diagnosis Attention deficit hyperactivity disorder (ADHD): parents of 44 boys; mean age: 11.1 years (SD = 2.4) TD: parents of 41 boys; mean age: 12.2 years (SD = 2.4)	Boys with ASD spend significantly more time playing video games than TD group.	Technology (video game) interest

(Continues)

TABLE 1 (Continued)

#	Study; location	Participants	Results	Skills identified
30	Mazurek and Wenstrup (2013); Columbia, MO	ASD: 202 adolescents (83.7% male); mean age: 12.1 years (SD = 2.8, range: 8–18) Parent-reported diagnosis of ASD TD: 179 siblings (49.2% male); mean age: 12.5 years (SD = 2.6, range: 8–18)	Children with ASD spent more hours per day playing video games than TD siblings.	Technology (television and video games) interest
31	Morris et al. (2015); Redmond, WA	Interviews: 10 neurodiverse technology workers (nine ASD, one ADHD) (three self-diagnosed, seven with formal diagnosis) Survey: 781 neurotypical engineers; 59 neurodiverse engineers	Interviews: six out of 10 participants perceived that they were particularly gifted in noticing patterns in information and mentally visualizing information; supported by follow-up survey Six out of 10 stated skilled at achieving high state of focus	Pattern recognition Mentally visualizing information High state of focus
32	Mottron et al. (2006); Montreal, Canada	Theory paper updating Enhanced Perceptual Functioning model	Explain differences between ASD and NT perceptual processing	Locally oriented visual and auditory perception Enhanced low-level perception Enhanced perception of first-order static stimuli
33	O'Riordan (2004); Cambridge, UK	ASD: 10 adults Diagnosed using the ADI-R TD: 10 adults Mean age of both groups: 22 years (SD = 3.6, range: 17–27)	ADS group superior at searching for targets Increases in target-distractor similarity slowed control group more than ASD group	Enhanced discrimination
34	O'Riordan and Plaisted (2001); Cambridge, UK	Study 1: ASD: 15 children (12 males, three females); mean age: 9:2 years (SD = 1:1, range: 6:9–11:3) Diagnosed by clinicians using specified criteria such as DSM-IV TD: 15 children (12 males, three females); mean age: 8:7 years (SD = 1:8, range: 6:9–11:2) Study 2: ASD: 13 children (11 males, two females); mean age: 9:0 years (SD = 1:1, range: 6:6–11:0) Same diagnostic criteria as study 1 TD: 13 children (11 males, two females); mean age: 8:6 years (SD = 1:2, range: 7:0–10:0)	Study 1: Children with autism were not slowed to the same extent as controls by increase in target-distractor similarity (supporting discrimination as rate-determining factor in visual search tasks) Study 2: Same as study 1; level of superiority of individuals with autism increases as target-distractor similarity increases	Enhanced discrimination

(Continues)

TABLE 1 (Continued)

#	Study; location	Participants	Results	Skills identified
35	Pilotte and Bairaktarova (2016); West Lafayette, IN	Literature review	Science, Technology, Engineering, and Mathematics (STEM) student demographics are changing as students with ASD chose to enroll in STEM majors. ASD students have different needs than TD peers.	STEM interest
36	Reinvall et al. (2013); Helsinki, Finland	ASD: 30 adolescents (20 boys, 10 girls); age range: 12.0–16.1 Prior ICD-10 diagnosis of Asperger syndrome TD: 30 adolescents (20 boys, 10 girls); age range: 12.8–15.2 Drawn from Finnish standardization sample for NEPSY-II	Adolescents with ASD demonstrated a significantly higher mean Verbal Intelligence Quotient on WISC-III compared to the standardized mean. No differences in FSIQ or PIQ ASD group had significantly lower scores than the control group on the subtests Auditory Attention and Response Set, Memory for Faces, Visuomotor Precision, and Design Copying on NEPSY-II.	Verbal reasoning
37	Remington and Fairnie (2017); London, UK	ASD: 17 adults (13 males); mean age: 30 years (SD = 3.6) Had a clinical diagnosis of ASD from criteria in DSM and ADOS TD: 19 adults (11 males); mean age: 23.6 years (SD = 5)	ASD better at detecting expected and unexpected sounds on auditory detection tasks	Increased auditory perceptual capacity
38	Roser et al. (2015); Plymouth, UK	ASD: 28 children (four females, 24 males); mean age: 13 years (SD = 1.64) Clinical diagnosis meeting either DSM-IV or ICD-10 criteria 10 adults (four females, six males) Diagnoses made by variety of health, educational, and social-services bodies TD: 22 children (12 females, 10 males); mean age: 13 years (SD = 1.62) 10 adults (six females, four males)	Learning shape pairs with high covariation was superior in ASD adults, while performance in children was same as controls.	Visuospatial learning Attending to local details
39	Russell et al. (2019); Exeter, UK	ASD: 24 adults (seven female); mean age: 38.5 years (SD = 12.6, range: 21–65) Had a clinical diagnosis of ASD on their medical records	Through semistructured interviews, most frequently cited skills were hyperfocus, attention to detail, good memory, and creativity.	Hyperfocus Attention to detail Good memory creativity

(Continues)

TABLE 1 (Continued)

#	Study; location	Participants	Results	Skills identified
40	Rutherford and Subiaul (2015); Ontario, Canada	Experiment 1: ASD: 18 children (15 males, three females); mean age: 6 years 9 months (range: 4 years 4 months to 10 years 2 months) Had clinical diagnosis of ASD via DSM-IV, independently confirmed by author using ADOS-G and ADI-R TD: 21 children (six males, 15 females); mean age: 4 years 9 months (range: 4 years 8 months to 4 years 10 months)	ASD groups displayed more exploratory (nonverbal) and explanatory (verbal) behaviors when presented with an unsolvable physical task. ASD group more likely to verbally ask experimenter for help.	Strong explanatory drive in nonsocial situations Possible systemizing cognitive style
41	Samson and Antonelli (2013); CA, participants were from Germany, Austria, and Switzerland	ASD: 33 adults 87.9% from Germany, 6.1% from Austria, 6.1% from Switzerland Had diagnosis of AS or HFA TD: 33 adults 90.9% from Germany, 3% from Austria, 6.1% from Switzerland Both groups: 14 males, 19 females; mean age: 33.49 years (SD = 10.49, range: 18–58)	On self-report questionnaire Values in Action Inventory of Strengths, individuals with AS/HFA score higher on open-mindedness, and lower on love, kindness, social intelligence, teamwork, leadership, appreciation of beauty, gratitude, and humor	Open-mindedness
42	Samson et al. (2012); Montreal, Canada	Quantitative meta-analysis of 26 fMRI articles	More activity observed in ASD group temporal, occipital, and parietal regions and less activity in frontal cortex than control group	Enhanced perception through enhanced functional resource allocation to regions associated with visual processing
43	Shah et al. (2016); London, UK	ASD: 20 participants (17 male, three female); mean age: 32.7 years (SD = 11.18) Clinical diagnosis from independent clinician, confirmed by research-reliable administrator using ADOS Group scored higher on SQ than TD group also TD: 20 participants (14 male, six female); mean age: 34.10 years (SD = 14.20)	Framing effects were significantly smaller in ASD group compared to TD group, even when matched for alexithymia.	Decision-making—reduced susceptibility to framing effect/enhanced logical consistency

(Continues)

TABLE 1 (Continued)

#	Study; location	Participants	Results	Skills identified
44	Smith and Milne (2009); Sheffield, UK	ASD: 15 adolescents; mean age: 14 years (SD = 1 year 8 months, range: 11 years 8 months to 17 years 6 months) Diagnosed by clinicians using DSM-IV criteria TD: 15 adolescents; mean age: 14 years 6 months (SD = 1 years 11 months, range: 12 years 6 months to 17 years 8 months)	ASD group detected more film continuity errors than TD group.	Attention to detail—reduced change blindness Enhanced perception
45	South et al. (2014); Provo, UT	ASD: 48 children and adolescents (three females); mean age: 13.21 years (SD = 2.27) Confirmed clinical diagnosis of ASD following DSM-IV, met criteria on ADOS TD: 56 children and adolescents (14 females); mean age: 12.57 years (SD = 2.60) All participants age range: 8–16 years	ASD group showed superior performance on the Iowa Gambling Task, through better learning in later stages of the task. The ASD group chose prominently from the advantageous decks.	Decision-making—drive to avoid potential loss
46	Spek and Velderman (2013); Eindhoven, the Netherlands	ASD: 29 adult males; mean age: 44 years (SD = 9.8) Previous diagnosis confirmed by ADI-R and semistructured interview assessing DSM-IV-TR criteria TD: 30 adult males; mean age: 41.9 years (SD = 8.5) Schizophrenia: 17 adult males; mean age: 39.7 years (SD = 12.4)	The results showed that the last and longest attained professions of the adults with Autism require more technical skills than those of the Schizophrenia and neurotypical group.	Technical skills
47	Vella et al. (2018); Oxford, UK	ASD: 38 adults (65.8% male); mean age: 34.1 years (SD = 15.4) Diagnosis independently confirmed using ADI-R; additional AQ and ADOS screeners TD: 40 adults (67.5% male); mean age: 34.0 years (SD = 14.7)	Iowa Gambling Task: ASD group chose more from advantageous decks in final block of trials Cambridge Gamble Task: Most logical choice was selected by ASD group on smaller proportion of trials; this difference was not significant after excluding participants with antidepressant or anxiolytic medications. ASD group took longer to make decisions	Decision-making—more logical approach and care in decision-making

(Continues)

TABLE 1 (Continued)

#	Study; location	Participants	Results	Skills identified
48	Turner et al. (2021); UK	502 UK University students responded to survey (medicine, $n = 344$; STEM, $n = 94$; non-STEM, $n = 64$)	Respondent interested in careers in technique-related medicine also reported higher AQ scores (Autism Spectrum Quotient) Respondents reporting interest in person-oriented careers in medicine reported lower AQ	Interests and preferences
49	Wakabayashi et al. (2007); Chiba, Japan	ASD: 48 adults (38 males, 10 females); mean age: 28.9 years (SD = 8.92; range: 16–48) Diagnosed by psychiatrists/authors using APA/WHO criteria TD: 137 adults from the general population (71 males, 66 females); mean age: 29.6 years (SD = 4.46, range: 23–46) 1250 university students to standardize quotients (616 males, 634 females); mean age: 19.4 years (SD = 1.35, range: 18–26 years)	ASD group scored significantly higher on the Systemizing Quotient (SQ) and significantly lower on the EQ than control groups	Systemizing
50	Wei, Christiano, et al. (2013); Menlo Park, CA	NLTS-2 ASD only: 920 young adults at wave 2 660 remained at wave 5 Classified under autism for special education under Individuals with Disabilities Education Act (IDEA) Info gathered through both parent and young adult interviews/surveys	Students with ASD in STEM fields were more likely to persist in a 2-year community college and were twice as likely to transfer from a 2-year community college to a 4-year university than their peers in the non-STEM fields	STEM interest/ability
51	Wei et al. (2012); Menlo Park, CA	NLTS-2 data wave 5 660 young adults with ASD Classified under autism for special education under IDEA Information from all other disability categories	Students with an ASD had the highest STEM participation rates, although their college enrollment rate was the third lowest among 11 disability categories and students in the general population.	STEM interest/ability

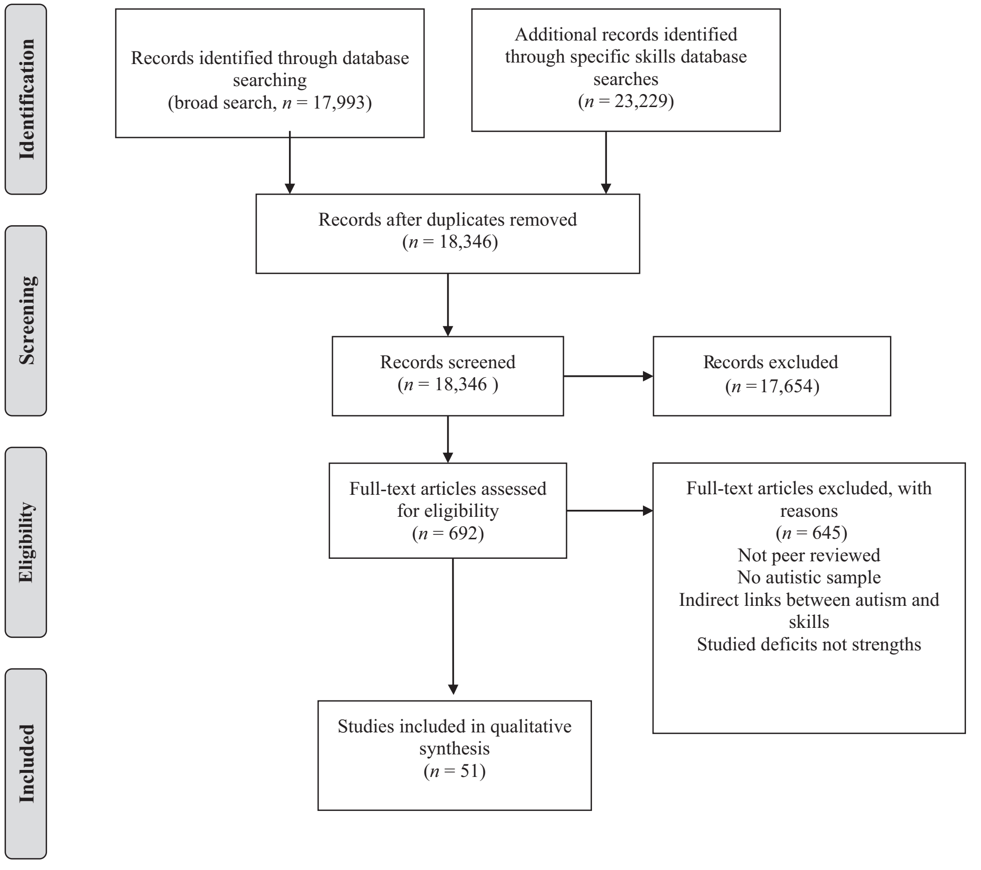

FIGURE 1 PRISMA flow diagram of study selection process.

RESULTS

This review included 51 studies (see Table 1 for summary of information for all studies). Studies took place primarily in the United Kingdom and the United States. Table 1 details more specific information regarding the location of the remaining studies, demographic data of participants (i.e., age, gender, diagnoses, and diagnostic classification system, etc.), results, and the skills identified. Authors of the included studies identified participants as autistic (or having autism/autism spectrum disorder [ASD]) through various methods. They described the establishment of diagnostic classification through the following approaches: verification of clinical or medical diagnosis, supplementary assessments, or screening to confirm diagnosis, eligibility for special education, and parent- or self-reported diagnosis; in one study (Morris et al., 2015), select participants self-diagnosed themselves with a specific "type" of autism based on their self-identified functioning levels (Pervasive Developmental Disorder in Kemner et al. [2008]; High-Functioning Autism in Jolliffe & Baron-Cohen [1997]). The DSM-IV, DSM-IV-TR, DSM-5, and/or ICD-10 served as the basis for diagnostic criteria. In three studies (Mazurek et al., 2012; Wei et al., 2012; Wei et al., 2013), researchers analyzed nationwide US data following postsecondary transitions for individuals with autism eligible for special education following the federal Individuals with Disabilities Education Act (IDEA) criteria (Individuals with Disabilities Education Act, 20 U.S.C. §§ 1400–1414).

Findings from these studies support the idea that select skill areas are more present in autistic individuals. These specific skills are outlined in Table 2 and defined in the preceding section. Different

TABLE 2 Identified skills with level of support.

Skill	Number of empirical studies	Number of self-report studies	References	Level of support
Visual abilities (perception, discrimination, acuity)	14	1	Ashwin et al., 2009; Brosnan et al., 2012[a]; Hagmann et al., 2016; Joliffe & Baron-Cohen, 1997; Joseph et al., 2009; Kaldy et al., 2011; Karmakar & Sarkar, 2020; Keehn & Joseph, 2016; Kemner et al., 2008; Lorenz & Heinitz, 2014[a]; O'Riordan, 2004; O'Riordan & Plaisted, 2001; Roser et al., 2015; Samson et al., 2012	Promising
Attention to detail (including on visual tasks)	7	1	Ashwin et al., 2017; Blaser et al., 2014; Fletcher-Watson et al., 2012; Gonzalez et al., 2013; Kaldy et al., 2016; Lorenz & Heinitz, 2014[a]; Smith & Milne, 2009	Promising
Decision-making	7	1	Bronsan et al., 2014; 2016; De Martino et al., 2008; Lorenz & Heinitz, 2014[a]; Shah et al., 2016; South et al., 2014; Vella et al., 2018	Promising
Systemizing	8	1	Baron-Cohen et al., 2003; Brosnan, Gwilliam, & Walker, 2012[a]; Caldwell-Harris & Jordan, 2014; Jordan & Caldwell-Harris, 2012; Kirchner & Dziobek, 2014; Lorenz & Heinitz, 2014[a]; Rutherford & Subiaul, 2015; Wakabayashi et al., 2007	Promising
STEM interest	5	1	Baron-Cohen et al., 2007; Wei et al., 2012; Wei et al., 2013; Turner et al., 2021; Lorenz & Heinitz, 2014[a]	Emerging
Affinity for technology	4	0	Mazurek & Engelhardt, 2013; Mazurek & Wenstrup, 2013; Mazurek et al., 2012; Spek & Velderman, 2013	Emerging
Verbal reasoning	1	0	Reinvall et al., 2013	Emerging
Auditory perception	3	1	Chen et al., 2022; Lorenz & Heinitz, 2014[a]; Remington & Fairnie, 2017	Emerging

[a]Some studies identifying multiple skills are counted multiple times (once under each identified skill).

visual abilities appeared most prevalent throughout research as a "specialized skill" inherent to autistic people. Visual perception, discrimination, and acuity were most common, identified in 14 separate studies, with attention to detail on visual tasks identified in seven studies. Making decisions and systemizing were recognized as consistent strengths for autistic individuals and were present in seven and eight studies, respectively.

Further, researchers explored special interests presented by autistic participants and where their unique skills may manifest in different careers. For example, evidence of autistic individuals presenting an interest in Science, Technology, Engineering, and Mathematics (STEM)-related fields resulted from five studies, and an affinity for technology resulted from four. Lastly, skills, including verbal reasoning and auditory perception, were present in one study and three studies, respectively.

The authors of the present study have identified the support levels for each skill in Table 2. To assist readers with comparing the support levels of each skill, investigators created two categories of support based on the number of empirically based articles that identified that particular skill. Researchers designated studies with six or more supporting empirical studies as having "Promising" levels of support. They categorized those with five or fewer supporting articles to have "Emerging" levels of support.

Identified skills

The research team coded and categorized each study by skill and summarized each identified skill below.

Visual skills

Visual perception

One of the most frequently cited strengths in the literature on autism is visual abilities. A review of related studies shows that visual abilities can manifest in various ways. Results indicate autistic individuals are often more successful at visual search tasks than neurotypical participants. In these tasks, investigators typically record the time it takes for someone to find a target object among distractor items or identify whether the target object is present (Kaldy et al., 2011; O'Riordan, 2004). Several studies have shown that autistic participants perform better on these types of tasks, results that sustained across various age groups, including toddlers (Kaldy et al., 2011), children (Hagmann et al., 2016), adolescents (Keehn & Joseph, 2016), and adults (O'Riordan, 2004). Based on results from Joseph et al. (2009), autistic groups react faster than neurotypical participants on static and dynamic search tasks (Joseph et al., 2009). In one study, when researchers increased the similarity between target and distractor items, the control group slowed down significantly more than the autism group, suggesting strength in visual discrimination (O'Riordan, 2004). Investigators have hypothesized that this enhanced discrimination in autism allows for more efficient visual search abilities (Kaldy et al., 2011; Kemner et al., 2008; O'Riordan & Plaisted, 2001). Relatedly, studies have examined eye movements on visual search tasks and found that autistic participants made fewer eye movements, indicating that they are not using a different strategy but have enhanced visual discrimination ability (Kaldy et al., 2011; Kemner et al., 2008).

Studies also show autistic individuals perform Embedded Figures Test (EFT) faster than neurotypical peers, which involves finding a specific shape inside a larger complex design (Joliffe & Baron-Cohen, 1997). Another study replicated this superior EFT performance finding while looking at visual acuity using the Freiburg Visual Acuity and Contrast Test (FrACT) and systemizing ability using the Intuitive Physics Test (Brosnan et al., 2012). Using regression analysis, researchers found a link between visual acuity and higher EFT performance based on results that showed participants with autism performed better on the EFT and visual acuity and systemizing measures than controls (Brosnan et al., 2012). Roser and colleagues (2015) found that autistic adults are also better at visuospatial learning tasks, extending the enhanced visuospatial processing findings demonstrated by visual search and EFT tasks. In this study, autistic adults were able to answer more items correctly on a visual statistical learning task involving shape-pair associations (Roser et al., 2015).

Researchers have put forward the Enhanced Perceptual Functioning Model to explain perception in autism (Mottron et al., 2006; Samson et al., 2012). This model describes locally oriented visual and auditory perception, enhanced discrimination, and enhanced perception of static stimuli. Brain activity in regions associated with visual perception is a possible explanation (Mottron et al., 2006). Using Activation likelihood estimation (ALE) meta-analysis of neuroimaging during visual tasks, autistic individuals have shown higher activity in posterior regions and lower activity in the frontal cortex, consistent with stronger engagement of visual processing regions (Samson et al., 2012).

Visual acuity

Another study also found better visual acuity in autistic individuals using the FrACT (Ashwin et al., 2009). Investigators found that autistic males had a visual acuity of 20:7, meaning they can see a level of accuracy and detail at 20 feet away that a typical person can see only at 7 feet away. However, some sources have questioned the methodology and validity of this study, and other studies have found no differences in visual acuity. For example, Bach and Dakin (2009) argue that this finding results from increased perseveration in the autistic group rather than superior visual acuity.

Increased attentional focus (on visual tasks)

Some researchers have proposed that the reason for better performance on visual tasks is attentional rather than perceptual (Kaldy et al., 2016). Investigators have used pupil responses to measure attentional engagement and cognitive effort. Pupil dilation is a biomarker of the locus coeruleus–norepinephrine (LC–NE) system, which includes the hippocampus, basal lateral amygdala, and prefrontal cortex (Blaser et al., 2014). Pupils reflect two components of LC–NE activity: tonic and phasic. Phasic activity is associated with focused attention. Researchers used phasic pupil responses for these studies as a real-time measure of attentional focus (Blaser et al., 2014). When analyzing data from a previous study (Kaldy et al., 2011), autistic toddlers had exaggerated task-related pupil dilations (Blaser et al., 2014; Kaldy et al., 2013). These results evidence a focused attentional state, described by authors as evidencing an inherent predisposition to focused attention among autistic individuals (Blaser et al., 2014).

In one study, the researchers created a naturalistic visual search task to detect dangerous items while screening luggage. While the autistic and neurotypical groups performed with equal accuracy, the autistic group improved in correctly eliminating target-absent bags faster than the control group (Gonzalez et al., 2013). The authors attributed this finding to the autistic group's ability to sustain attention longer than the control group. Regarding the perspectives of autistic persons, Morris and colleagues (2015) conducted interviews with software industry autistic employees regarding their occupational skills and found that they commonly reported noticing patterns in information, mentally visualizing information, and achieving a high state of focus as key strengths (Morris et al., 2015).

Attention to detail (change blindness and detail-focused cognitive style)

Investigators have also studied attention to detail through change blindness, a phenomenon in which people do not see changes to a visual scene if there is an interruption between the scenes (Ashwin et al., 2017). Several studies have found that autistic individuals have reduced change blindness, although the literature is less consistent, and other studies have found increased change blindness in autism or no difference. Variation in results may be the outcome of the use of diverse methodologies (Ashwin et al., 2017; Smith & Milne, 2009). In one study, autistic adults could more quickly detect changes to items of marginal interest.

In another change-blindness task, although they were less accurate with marginal changes overall, autistic children were faster than the control group children in detecting marginal color and location changes and central presence/absence changes (Fletcher-Watson et al., 2012). Autistic children were also faster than adults at detecting marginal color changes. Another study used continuity errors within short film clips and found that autistic adolescents could detect more continuity errors than the control group. Both groups found more errors in the scene's central rather than marginal aspects, although this effect was smaller in the autistic group (Smith & Milne, 2009). These studies suggest that autistic people have a different attentional style that may result in greater attention to detail.

One study reviewed over 50 research studies and found that autistic people do better on tasks that require detail-focused processing, such as the EFT, Wechsler Block Design, and motion coherence threshold tasks (Happe & Frith, 2006). They used this evidence to describe the weak central coherence theory, a cognitive style of autism defined as detail-focused and biased toward local rather than global processing.

Autistic people also regularly identify attention to detail and associated characteristics as personal strengths across empirical publications. Studies regarding self-reported strengths of autistic individuals have also found that participants most frequently cited hyperfocus, attention to detail, good memory, and creativity as advantageous traits they associate with their autism (Russell et al., 2019). Lorenz and Heinitz (2014) identified similar conclusions noting that autistic participants selected attention to detail, logical reasoning, focus, systemizing, consistency, visual skills, retentiveness, repetitiveness, and numbers from a list of 26 strengths more often than the control group.

Decision-making (deliberative and logical consistency in decisions)

Research has identified two aspects of decision-making strengths in autistic individuals: deliberative decision-making and logical consistency. Most studies combined logical thinking with decision-making, so this section combines these skills. In one study using the jumping-to-conclusions beads task, autistic adolescents showed a more circumspect reasoning bias when making decisions (Brosnan et al., 2014). In this study, researchers showed participants a series of beads and instructed them to decide which of two jars the beads were taken from. This probabilistic reasoning task relies on each jar's different proportions of black and white beads. After each decision, participants also reported their confidence in their choice. While the autistic and control groups were equally confident, the autistic group requested more beads before deciding (Brosnan et al., 2014). This demonstrates a more thorough decision-making style that involves gathering more data. The authors of this study linked these results to the E–S theory (Baron-Cohen, 2009). They noted that this type of reasoning style could benefit science and engineering occupations because the systematizing approach can help weigh all the evidence and make informed decisions (Brosnan et al., 2014).

Similarly, the Dual Process Theory Account posits that autistic individuals are biased toward slower, deliberative decision-making and possibly away from intuitive decision-making (Brosnan et al., 2016). Studies have measured intuition versus deliberation and found that autistic individuals show more deliberative responses on the Cognitive Reflection Task (CRT). They also self-report significantly lower levels of intuition on the Rational–Experiential Inventory—Short Form (REI-S) than the control group (Brosnan et al., 2016). Overall results revealed that individuals with high autism traits and those with diagnosed autism showed a pattern of lower intuitive and greater deliberative reasoning (Brosnan et al., 2016).

Another study examined decision-making using the Iowa Gambling Task with children and adolescents (South et al., 2014). Participants choose a card from four decks and either gain or lose money, with each deck having different sizes and frequencies of gains and losses. Over 100 trials, autistic participants performed better on the task and chose from the advantageous decks more than the control group. Investigators attributed this to improved learning and a desire to avoid the risky high-reward/occasional high-loss deck. These results may be evidence of a more deliberative decision-making style focused on risk avoidance (South et al., 2014).

Vella et al. (2018) have replicated superior performance on the Iowa Gambling Task. However, these authors attribute this performance to a greater ability to maintain a repetitive yet logically advantageous strategy. This same study also found that the ASD group took longer to make decisions on the Cambridge Gamble Task (Vella et al., 2018). This task assessed flexibility in decision-making by changing the probabilities of success on each trial. There were no group differences in the proportion of points bet, indicating that both groups adjusted their choices flexibly in response to changes in information. The authors concluded that these patterns emphasize the autism group's use of logic and effort in decision-making (Vella et al., 2018). This bias may benefit some STEM tasks, such as mathematics (Vella et al., 2018).

Related to this, studies have also focused on increased logical consistency in decision-making. These studies often consider the "framing effect," a decision bias where the context or the way the information is framed highly influences people's decisions (as in keeping $30 vs. losing $20 out of an initial $50; De Martino et al., 2008). Studies have shown reduced susceptibility or smaller framing effects in autistic individuals (De Martino et al., 2008; Shah et al., 2016). One study used skin conductance responses and proposed that the reduced susceptibility to the framing effect resulted from the failure to incorporate emotional cues on the gambling task (De Martino et al., 2008). In response, other researchers replicated the study while also looking at the role of emotional awareness. They found that even when autism and control groups were matched for alexithymia (i.e., difficulty identifying one's own emotions), autism groups still showed enhanced logical consistency on the same gambling task (Shah et al., 2016). This finding suggests that logical consistency is a trait of autism, not resulting from a lack of emotional awareness.

As stated above, recent research on self-reported strengths of autistic individuals has highlighted several attributes that map onto the skill areas detailed above. Additional research regarding self-identified strengths for this population also report creativity, authenticity (Kirchner et al., 2016), love of learning, open-mindedness, and fairness (Kirchner et al., 2016; Samson & Antonelli, 2013) as the most commonly selected strengths (McGrath, 2019).

Other skills with limited research

The authors of the present study also identified other skills in the literature. However, they only found these skills across some studies. One study found a strength in verbal reasoning, as measured by the verbal intelligence quotient on a cognitive measure (Reinvall et al., 2013). Another study identified a strength in auditory perception. The autistic group better detected both expected and unexpected sounds on an auditory detection task (Remington & Fairnie, 2017).

Personal and vocational interests

In addition to skills, research has highlighted certain interests associated with autism that may be related to careers, particularly in the STEM fields.

Affinity for technology (media/video game use and autism technology programs)

While research does not thoroughly illustrate a clear link between autism and an interest in technology, there are a few studies of note. One study investigated the anecdotal reports of autistic youth's interest in technology and computers using data from the National Longitudinal Transition Study-2 (Mazurek et al., 2012). These data consisted of parent interviews for children under the special education categories of autism, speech/language impairment, intellectual disability, and learning disability. Researchers found that a large percentage of autistic youth reported solitary screen-based media use as a primary and preferred activity. They engaged in nonsocial electronic media use at significantly higher rates than respondents representing other disability categories (Mazurek et al., 2012). Other studies of autistic youth have found that they spend significantly more time playing video games than their siblings (Mazurek & Wenstrup, 2013) and a typically developing control group (Mazurek & Engelhardt, 2013).

Other studies have focused more on the application of the autistic interest in technology to cultivate career and other positive outcomes. One study used a technology-based program to teach social and technical skills needed for employment and explore technology careers (Dunn et al., 2015). Participants learned new skills and knowledge and could collaborate, both of which could help with future employment (Dunn et al., 2015). A later study utilized the same design software and program to explore how the interests of autistic students can be built upon to promote social engagement (Diener et al., 2016). The authors point to an interest in technology in autistic students as a mechanism that can facilitate both vocational and social readiness for a career in STEM (Diener et al., 2016).

STEM interest

Investigators have mostly studied broader STEM interest in autism through college majors. One study found higher rates of autism in math majors than in control majors (Baron-Cohen et al., 2007). Finding a ninefold difference, these researchers attributed this interest in math to a link between autism and systemizing strengths. Another study using data from the National Longitudinal Transition Study-2 found that although college enrollment for autistic students is lower than most groups, they participate in STEM at rates higher than students with other disabilities and higher than the general population (Pilotte & Bairaktarova, 2016; Wei et al., 2012). Of those who attend college, autistic students are the most likely group to major in STEM, with 34.3% of the autistic group choosing an STEM major compared to 22.8% of the general population (Wei et al., 2012). A later study used this same data source to understand the persistence of autistic students beyond enrollment (Wei et al., 2013). Autistic college students in the STEM fields were more likely to persist and transfer from a 2-year college to a 4-year university than those in non-STEM fields (Wei et al., 2013). These findings have resulted in some researchers identifying a need for guidance for engineering faculty in addressing the challenges of a more diverse student population (Pilotte & Bairaktarova, 2016). In addition, there is some evidence to suggest that the most recent and the longest attained jobs of autistic adults required more technical skills than those of control groups; highly technical jobs included technicians and electrical and software engineers, while less technical jobs included social workers and salespeople (Spek & Velderman, 2013). Practitioners should consider this information when counseling individuals in future careers, particularly as one considers the maintenance of jobs and overall longevity in employment.

Interest in systemizing/understanding systems

Some studies have identified a preference for systemizable domains in autistic individuals. Studies that have examined special interests in both autistic groups and neurotypical controls found more intense interests in systemizable domains such as machines and technology, sciences, and sorting, categorizing, and organizing for the autistic group (Caldwell-Harris & Jordan, 2014; Jordan & Caldwell-Harris, 2012). Another study specific to employment found that although autistic individuals reported interest in social sciences and creative fields almost as often as STEM, within those fields, they engaged in systemizing rather than creative aspects (Kirchner & Dziobeck, 2014).

As far as behaviors associated with systemizing, one study found that autistic children displayed more exploratory (i.e., nonverbal) and explanatory (i.e., verbal) behaviors when presented with an unsolvable physical task than a social task (Rutherford & Subiaul, 2015). They describe these findings as displaying a strong explanatory drive-in nonsocial situation and possibly a systemizing cognitive style. As mentioned elsewhere, the E–S theory says that autistic individuals may be interested and skilled in systemizing. To investigate this theory, researchers created the systemizing quotient (SQ) to measure an individual's interest in systems (Baron-Cohen et al., 2003). Several studies have found that autistic adults score significantly higher on the SQ than typically developing control groups (Baron-Cohen et al., 2003; Wakabayashi et al., 2007). Annabi et al. (2017) reviewed current theories of autism, primarily focusing on the hypersystemizing theory because of its description of talent in autism. Through reviewing this theory, they identify attention to detail, systemizing, information processing, and specialization of interests as skills of autistic individuals. Investigators then compared these strengths to skills identified in the literature and by the US Department of Labor as needed for software developers. The two most common skills required were programming and problem-solving. The authors describe that attention to detail in the context of systems is an important characteristic of both programming and problem-solving. When also considering specialized interests in this area and decision-making skills, autistic individuals may possess many of the skills required to work in software development (Annabi et al., 2017). Matching skill sets to potential careers is of clear importance for employment counselors.

Matching skills to the department of labor

Various factors, fueled by technological advances, have transformed the workplace and the trajectories of careers themselves, dramatically changing skills requirements and demands. This makes occupational fit—the match between an individual's skill and their job's skill requirements—and defensible skills—skills related to work activities that machines cannot perform—increasingly important. The rapidly changing labor market creates opportunities for autistic individuals, opportunities that stakeholders can identify by combining the available literature on autistic traits with an analysis of labor market skill requirements and demands (Griffiths et al., 2021).

For example, this paper demonstrates that autistic individuals have consistently performed well on visual acuity tests, partly due to an increased ability to focus. This trait's most relevant workplace abilities include far vision, near vision, perceptual speed, visual color discrimination, and visualization. Relevant occupations may include Maintenance and Repair Workers, Electricians, Construction Managers, and Electronic Engineers (National Center for O*NET Development, 2023).

Attention to detail is another common trait among autistic individuals. This essential skill set overlaps with many key workplace activities, such as evaluating information to determine compliance with standards and documenting/recording information, and is an important part of jobs ranging from Registered Nurses to Accountants and First-Line Supervisors of Mechanics, Installers, and Repairers (National Center for O*NET Development, 2023). This study uses the phrase systematizing to refer to a combination of two factors: the tendency for autistic individuals to take an interest in categorizable, organizable fields such as STEM fields, and autistic individuals' strengths at systemizing, the activity of analyzing or building a system that is so essential to these fields. Systematizing is relevant to a wide variety of industries, from Manufacturing to Professional, Scientific, and Support Services, and plays a key role in STEM occupations such as Software Developers, Automotive Service Technicians, and First-Line Supervisors of Construction Trades and Extraction Workers (National Center for O*NET Development, 2023).

Employment counselors may have access to databases to evaluate and match labor market data needs to particular skill sets. The employment counselor may work with educators and employers in these fields to design interventions to support skill development in relevant content areas and develop a clear path to long-term employment. For employment counselors to do this effectively, they must be equipped with a data-based decision-making framework.

DISCUSSION

To foster a successful work environment, emerging research emphasizes the importance of promoting overall awareness of autism, the unique characteristics, and traits inherent to autism, and the individual's personal interests, experiences, strengths, and skills (Bennett & Dukes, 2013; Diener et al., 2020). Individual specific learning and processing often influence a person's employment needs. In autistic employees, these skill sets often include detail-oriented and systematic decision-making, resulting from tendencies toward centralized or localized processing (Happé & Frith, 2006; Mottron et al., 2006), sensory hypersensitivity (e.g., higher visual acuity), enhanced pattern recognition, logical consistency, and systemized thinking (Baron-Cohen et al., 2009). Further, selective or restrictive interests inherent to autism can often lead to specialized or specific skill sets. However, research has not yet verified the assumption that these special interests involve an innate propensity toward select occupations or interests (e.g., STEM fields or technology). By understanding these elements of autism in the workplace, employment counselors can promote awareness and appropriate support for autistic employees and their employers.

Autistic individuals transitioning into the workforce frequently encounter barriers to gaining or maintaining employment (Diener et al., 2020). Historically, research and support for autistic people in the workforce have dwelled on deficits related to social, behavioral, and processing traits. On the contrary, this systematic review explored the employment needs of autistic individuals, with a specific focus on their unique and specialized skill sets. This paper aims to inform and enhance future work prospects and offer valuable insights into autistic individuals, families, practitioners, educators, and employers. Researchers have suggested that identifying specialized interest areas can benefit social, communication, behavioral, and functional skills for autistic people in the workplace (Bross & Travers, 2017). Employment counselors are well-positioned to identify and match the distinct skill sets of autistic individuals to current labor market needs, thereby creating more successful and sustainable opportunities in the workplace. They may also work with employers to implement strategies to foster skill use and development. Employers can support the use of specialized skills through the process of *job carving*, by which an employee customizes work activities and tasks to suit an individual's interests and skills, resulting in more concentrated and productive work efforts (Citron et al., 2008; Nietupski & Hamre-Nietupski, 2000).

In addition to support at the individual level, community members can design programs in school settings and workplaces to provide assistance for groups of neurodivergent individuals. Unfortunately, while transition services during high school are identified as significant predictors of future job success in autistic students (Chiang et al., 2013), research on specific transition programs or curriculum for this population is persistently lacking and there is little consensus around how to make positive impacts (Bennet & Dukes, 2013).

Currently, there are limited formal programs to support autistic employees and insufficient empirical consensus on how to guide employers or work-based supervisors in supporting autistic employees. Wehman and colleagues (2012) found that Project SEARCH, a program designed to support youth with disabilities in transitioning to adulthood and pursuing employment, serves as an effective intervention in assisting autistic youth with gaining competitive employment by implementing specific supports (e.g., intensive instruction in social, communication, and job skills; visual supports; and work routine and structure). Additionally, the Acquiring Career, Coping, Executive Control, and Social Skills (ACCESS) program provides a group intervention designed to support autistic young adults to develop helpful skills to enhance their experience in the workplace (e.g., social and adaptive skills, self-determination skills, and coping self-efficacy; Oswald et al., 2017). To promote employers' self-efficacy and neurodiversity in the work environment, regarding their modification of the workplace to support autistic employees, the Integrated Employment Success Tool (IEST; Autism CRC, 2024) has demonstrated some evidence. The IEST program requires further research due to a lack of significant outcomes, overall.

Limitations and future directions

Previous researchers have not systematically reviewed the literature in this manner related to specific skills, employability, and autism. These inter- and multidisciplinary topics shed light on the importance of theory and research while informing practice.

Strengths and limitations

Approaches that include emphasizing and understanding the unique traits of autistic individuals will improve outcomes for organizations and neurodivergent people. Reviewing these critical elements enhances conversation surrounding opportunities for neurodivergent populations in the workplace—supporting employees and their employers. Across the research studies reviewed in this paper, investigators used various methods when establishing groups of participants. For instance, studies compared groups of neurodivergent and neurotypical participants, different neurodivergent participants (e.g., autism, ADHD), and other group characteristics (e.g., college majors, special education classification). Additionally, diagnostic criteria for identifying participants included a range of categorizations (e.g., ASD, Asperger's syndrome, and high-functioning autism), as well as different taxonomic systems or editions (e.g., DSM-IV, DSM-IV-TR, DSM-5, ICD-10). Variability within and across groups may limit the generalizability of findings, and researchers should continue to explore this in future studies. Regarding the DSM-5-TR (2022), at the time of this review, researchers of the included studies did not report using this text as it was not available when most of these studies were conducted. Additionally, the American Psychological Association (APA) did significantly modify the diagnostic criteria for ASD in the publication of the DSM-5, which may impact outcomes of the populations studied. Of the studies using the DSM included in this review, at least one study used the DSM-5, with the remaining studies utilizing the DSM-4, or did not specify which diagnostic criteria they used. Shifts in diagnostic criteria present the potential for changes in who identifies with or receives an autism diagnosis; researchers should address this in future studies.

Practical implications for employment counselors and future research

Across all age groups, people with disabilities gain and maintain employment significantly less than those without disabilities (Bureau of Labor Statistics [BLS], 2023). In 2022, approximately 21% of individuals with disabilities participated in the workforce—compared to 65% of those without disabilities (BLS, 2023). By analyzing over 100 million online resumes and profiles, alongside other relevant labor market data, Griffiths and colleagues (2021) identified high-demand skills needed in the future workplace. Among these skills, they found that communication, agility, innovation, creativity, lifelong learning, problem-solving, decision-making, and interpersonal skills are critical for gaining future employment.

Based on our review of literature, autistic workers possess and potentially excel in skills from this list, namely, innovation, problem-solving, and decision-making skills. However, researchers and practitioners must recognize other traits consistent with autism that may present barriers in particular tasks or workplace settings. This could include internal factors such as rigid thinking, preferring routine or "seeking sameness," comorbid conditions, and other difficulties related to communication or socialization (Chen et al., 2015). Additionally, external challenging factors autistic employees may face include employer attitudes, limitations in vocational services or disability-related benefits, and family socioeconomic status (Chen et al., 2015). Although our study is primarily focused on strengths in this population, it is important to understand how to both leverage strengths and dismantle barriers.

By better understanding the needs of the individual and workplace settings, as well as strengths, and inherent skill sets common in autistic employees, all team members can contribute to a more prosperous workplace. While various programs are emerging to support autistic young adults in successfully transitioning into the workforce (e.g., ACCESS program), there is a dire need for further research to confirm the effectiveness of workplace programs for autistic employees (Bross & Travers, 2017; Oswald et al., 2017; Scott et al., 2018). Common elements of these programs, and important components for employment counselors to incorporate, include adopting a team-based approach to effectively identify needs, outline goals, rely on evidence-based tools and practices, and monitor progress (Griffiths et al., 2021).

It is critical that employment professionals understand and support the various aspects required to develop inclusive work environments. In a model for integrating special interest areas in the workplace, Bross and Travers (2017) recommend (a) assessing for preference and interest areas, (b) matching interests with opportunities, (c) developing a plan for necessary training and materials, and

(d) implementing ongoing evaluations for success. By prioritizing special interest areas, all parties can work together in incorporating a strength-based approach. With this understanding, employment counselors may support organizations looking to diversify their workforce and leverage the skills of neurodivergent workers. For those interested in integrating labor market data into this process, Griffiths and colleagues (2021) have proposed the following model intended for K-12 youth, which the employment counseling field could consider for adaptation. The model is composed of the follow six-step process: assessing strengths and needs, developing a vision and goals, assembling a team, implementing tools for skill building, skill practice, and monitoring progress and re-evaluating goals.

CONCLUSION

The results of this literature review provide a detailed outline of the workplace skill sets of autistic individuals. The analysis included 51 studies from over eight countries and research that presented theoretical analysis, meta-analysis, literature reviews, and original research. The included studies endorsed various methodologies with diverse group comparisons using neurodivergent and neurotypical participants. Overall, consistent themes emerged focusing on how autistic participants internally process external information; the most substantial and recurring skill area was visual processing. Autistic individuals regularly outperformed or demonstrated higher acuity on tasks that measured visual perception, discrimination, acuity, and attention to detail. Second, evidence supported autistic participants' decision-making and systemizing skills as superior traits. Over a dozen studies throughout multiple countries reported these findings.

These findings provide valuable insights into the employment needs of autistic individuals, focusing on their unique traits, special interests, and skill sets. Despite growing interest in inclusive workplaces, autistic individuals face higher unemployment rates and challenges sustaining long-term employment than their neurotypical colleagues. To address this disparity, this study identified and analyzed various theories and models, including weak central coherence, E–S theory, hypersystemizing theory, monotropic theory, and the Enhanced Perceptual Functioning Model, to better understand the strengths and needs of autistic employees.

With the crucial role that employment counselors play in promoting workplace diversity and inclusion, this information provides essential support to autistic employees and their workplaces. As the nature of work rapidly evolves, counselors must adopt an ecological perspective to consider individual and contextual factors impacting prospective employees. Understanding common traits, skills, strengths, and interests of autistic individuals can guide counselors in broadening access to vocational opportunities for this population. Findings from this study emphasize the valuable role of autistic individuals in the modern workforce. By employing autistic individuals and maintaining an inclusive and supportive work environment, employers receive new perspectives and skill sets, leading to enhanced productivity and innovation. Through concerted efforts and an empowering workplace, we can foster an environment where the full potential of autistic individuals can be realized and where they can thrive in their chosen career paths.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The review protocol was not registered before the implementation of the review. Data extracted from included studies can be found in the tables in this article.

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How to cite this article: Griffiths, A. J., Torres, R., Delgado, R., Hurley-Hanson, A. E., Giannantonio, C. M., Walrod, W., Maupin, Z., & Brady, J. (2024). Understanding unique employability skill sets of autistic individuals: A systematic review. *Journal of Employment Counseling*, 1–31. https://doi.org/10.1002/joec.12223