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How can the work environment be redesigned to enhance the well-being of individuals with autism?

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How can the work environment be redesigned to enhance the well-being of individuals with autism?

Abstract:

Purpose - This article examines the opportunities to create optimal conditions for individuals with autism, to work successfully within the contemporary workplace and improve their well-being. These opportunities arise from digital technology (DT) development, enabling the work environment to be remodeled by providing new possibilities and ways of working. The author discusses both technology-based as well as non-technological accommodations supporting overcoming the workplace challenges faced by employees with autism.

Design/methodology/approach - A qualitative research was conducted with the use of in-depth interviews with 21 individuals with expertise in the field.

Findings - Possible technology-based work environment modifications and non-technological managerial practices facilitating work integration and the long-term well-being of individuals with autism were proposed. These solutions address four main problems: 1) effective communication; 2) time management, task prioritizing, and organization of work; 3) stress management and emotion control; and 4) sensory sensitivity.

Practical implications - Proposed solutions include primarily the wide usage of electronic mediated forms of communicating based on non-direct and non-verbal contact; a flexible approach towards work organization; accurate stress monitoring systems; and an individualized approach toward office space arrangements limiting external stimuli.

Originality/value - All this could lead not only to an increase in employment in individuals on the autism spectrum but also influence the improvement of the job performance of already employed. Modifications introduced could improve the long-term well-being of all employees, both with autism and neurotypical ones.

Keywords:

Neurodiversity; Autism; Digital Technology; Work Environment; Well-being.

Introduction

Neurodiversity refers to the diversity in human cognition, which is a natural phenomenon (Singer, 1999). It can be defined as any kind of cognitive processing or way of making sense of the world that deviates from "typical" ways of thinking and being (Hendrickx, 2010). Initially, this term only referred to autism spectrum disorders (ASD), and now is perceived much more broadly and includes i.a. individuals with dyslexia, attention-deficit hyperactivity disorder (ADHD), dyspraxia, Alzheimer's disease, depression, epilepsy, bipolar disorder, Tourette's syndrome, as well as autism(McGee, 2012). Some estimations suggest that up to 20% of the population might have a neurodivergent condition (Honeybourne, 2019).

The number of people diagnosed with autism is constantly growing. Nowadays, 1 in every 54 children aged eight in the United States may have this disorder (Maenner *et al.*, 2020), and it is estimated that approximately 1 in 100 people in the United Kingdom are on the autism spectrum (National Autistic Society, 2021). Autism is characterized by i.a. persistent deficits in social communication and social interaction in multiple contexts and restricted, repetitive patterns of behavior, interests, or activities (American Psychiatric Association, 2013). High vulnerability to stressors (Bishop-Fitzpatrick *et al.*, 2017), and sensory sensitivity (Tomczak, 2021) faced by individuals with autism lead to significant underrepresentation in the labor market (Anderson *et al.*, 2017). According to estimations in the United States, the unemployment/underemployment rate for individuals on the autism spectrum is greater than 90% (Gerhardt and Lainer, 2011), and just one in five autistic individuals in the UK are in any form of employment (Brown, 2021). However, some persons on the autism spectrum with lower support needs, represent high professional competence and can work efficiently when they are provided with conditions to overcome workplace challenges (Austin and Pisano, 2017).

Academic literature still lacks contextualized, practical advice for employers and neurodiverse employees, and the science-practitioner gap is growing (Doyle and McDowall, 2021). Thus, this article examines the technology-based as well as non-technological opportunities to create optimal conditions for individuals with autism (with low support needs), to successfully work in the contemporary workplace and improve their well-being. These modifications are aimed at overcoming barriers according to a social model of disability perspective (Oliver, 1983; 1990), what constitutes an original contribution to the theory within the topic.

Research on autism and work

Over the years, more attention has been devoted to the issues of integration of neurodiverse individuals, including primarily those with autism, into the labor market (Doyle, 2020). This translates into a growing body of research

on interventions directed at vocational rehabilitation, promoting employment, or workplace accommodations. Most of these studies were practically-oriented and did not have a broad theoretical reference. For example, some authors focused on interventions targeted to promote employment (Hayward *et al*., 2019), long-term employment success (Brooke *et al*., 2018), employment programs and practices (Hedley *et al*., 2017), or vocational skill enhancement (Seaman and Canella-Malone, 2016). Others analyzed trends in employment for individuals with autism (Chen *et al*., 2015), success factors enabling employment (Dreaver *et al*., 2020), and predictors for work participation, work performance and successful employment outcomes (Waisman-Nitzan *et al.*, 2020). Researchers emphasized workplace accessibility (Waisman-Nitzan *et al*., 2021) and identified barriers to employment together with sources and impact of occupational demands for employees with autism (Mai, 2019). Other studies were dedicated to workplace accommodations (Khalifa *et al*., 2020) or focused on technology-aided interventions for employment skills (Walsh *et al*., 2017), and presented future perspectives for employees on the autism spectrum in the digitized work environment (Tomczak, 2021). It should be noted that interventions tailored to improve the situation of employees with autism in the workplace are increasingly based on various technological solutions.

Technology aimed to support well-being in the workplace

The effect of technological changes on labor relations has been discussed for years (Cornfield, 2013). Due to the dissemination of digital technology (DT), its importance constantly increases and contemporary advanced technology exerts a more powerful effect on the labor environment than in the past (Min *et al*., 2019).

Digital technology covers both hardware (personal computers or mobile devices) and software (web applications, social networking spaces, chat sites, etc.). It combines a wide range of resources and tools that people might access inside and outside the workplace (Abbott, 2007), including wearable technology products that a person can wear on their body during daily activities to generate, store, and transmit data (Jacobs *et al.,* 2019). DT is increasingly utilized for addressing occupational health and safety vulnerabilities from job content or process factors, adding to the wellness of employer organizations. If people with autism received appropriate work participation tools, they could flourish in their work roles, which would be equally beneficial for their employer's organization (Mpofu *et al*., 2021). In addition to technological solutions for the general population, there are also tools tailored for specific groups of recipients to meet their particular needs or characteristics. Such solutions are part of the assistive technology (AT), which is a powerful enabler of participation (Desmond *et al*., 2018). AT is a subset of health technology that can be defined as applying organized knowledge and skills related to assistive

products, including systems and services (Smith *et al.,* 2018). Overall, positive experiences of AT were reported, with its use more than doubling in recent years (O'Neill *et al*., 2020). Moreover, in the case of individuals on the autism spectrum, AT can be used widely and successfully (Wali and Sanfilippo, 2019), contributing to the improvement of their work performance and well-being.

Autism and well-being

Healthy workforce is a key determinant of sustainable economic and human development (González-Cantón *et al*., 2019). Thus, health and well-being initiatives appear increasingly more often in the workplace context and can be found in government policy documents promoted by management consultants and human resources management (HRM) practitioners. They are also present in contemporary academic debates on business and management (Foster, 2018). An example of a strategic approach focusing on remaining employees physically and mentally healthy and employable is the Integral Health Management (IHM) developed by Zwetsloot and Pot (2004). It aims to bring the company direct economic benefits by reducing the costs of sickness absence and working disability while at the same time increasing the productivity and resilience of the company and its employees (Zwetsloot and Pot, 2004). The employee-centered approach is also gaining popularity as part of the sustainable HRM concept (Richards, 2020), enabling employees to achieve long-term wellbeing. Overall, there is a strong need to promote health actions to increase societal safety, safety culture, and safety climate (Clarke, 2019). Socially vulnerable groups should not be neglected in this context as well (Pikoulis *et al.*, 2020), and neurominorities certainly belong to this group. Therefore, the Ability, Motivation, and Opportunity (AMO) framework introduced by Kellner *et al*. (2019) was recently adopted by Szulc *et al*. (2021) to explore the perspective of well-being of neurodivergent employees. However, the problem of improving the well-being of employees with autism is still underexplored.

Due to the unique characteristics of individuals on the autism spectrum, maintaining well-being in the work environment could be even more challenging than in the case of neurotypical employees. The common human experience is that sometimes we face difficulties thinking, remembering, and paying attention at work. For people on the autistic spectrum, these difficulties may have been a long-lasting condition as a result of different cognitive styles (Weinberg and Doyle, 2017). Individuals with autism have certain features that, combined with work environment requirements, could contribute to an increase in stress levels, a deterioration of well-being (Pearson and Rose, 2021), and in the longer term, contribute to job burnout (Raymaker *et al*. 2020). Employees with autism are also at risk of stereotyping, bias, and stigmatization (Johnson and Joshi, 2016) from supervisors

and co-workers, impacting access to work experience and skill development (Krzeminska *et al*., 2019), and negatively affecting their wellbeing and mental health (Mastroianni and Storberg-Walker, 2014).

Theoretical underpinnings

There are different approaches that can be used as a theoretical reference (such as AMO, IHM, or the employee-centered approach mentioned above), but in this case the author refers to the assumptions of a social model of disability perspective introduced by Oliver (1983). It mandates barrier removal (Shakespeare, 2006), thus fitting best with the purpose of the study. This model proposes that not only impairments, but also the structure and environment, which are at least partly constructed by others, create barriers for disabled workers (Oliver, 1990). For employees with autism, these barriers include the work environment, culture, attitudes, and technology. Although the leitmotif of this article is barriers in the sphere of work environment and technology, the success of any modification in this area is also related to overcoming cultural and attitude-related barriers, which is possible by implementing appropriate managerial practices in the organization. The holistic approach is a new and original contribution of the presented research compared to previous studies. The utility of this model for the present study is based on the assumption that overcoming all these barriers can lead to the development of a workplace that allows the successful inclusion of individuals with autism by contributing to improving long-term well-being among representatives of this group.

Therefore, through the lens of a social model of disability, four key areas that form the focus of this study were identified based on the review of the current literature, as follows:

1) Effective communication.

Some barriers and challenges are associated with limited social skills and social reciprocity (DMA, 2019; Hayward *et al.*, 2020), including establishing and maintaining interpersonal relationships based on effective communication (Ortiz, 2020; Tomczak *et al.,* 2021). Both verbal and non-verbal communication can be hampered (Flower *et al.*, 2019), and understanding jargon and metaphors may also cause a problem for this group (CIPD, 2018). Individuals with autism usually face difficulties in conceptualizing and illustrating abstract ideas (CIPD, 2018).

2) Time management, task prioritizing, and organization of work.

Other characteristics which may impact their work performance and wellbeing are related to the challenges in time management (Wehman *et al.,* 2016), self-organizing, task prioritizing, and multitasking (Howlin *et al.,* 2005). Another condition is poor flexibility and adapting to changes in structure and routine (Browning *et al.,* 2009).

3) Stress management and emotion control.

Another critical feature concerns low resistance to stressors (DMA, 2019) and poor stress control skills (Tomczak *et al.,* 2018, 2020, Tomczak, 2021).

4) Sensory sensitivity.

Challenges are also associated with sensory hypersensitivity and vulnerability to external stimuli, such as sound, visual, olfactory, and tactile factors (DMA, 2019).

Support in these four areas may be provided primarily with the use of solutions based on new technologies, as well as non-technological organizational practices. These factors are crucial to improving long-term well-being at work and, therefore, are facilitators of the inclusion of people with autism in the workplace. Thus, they constitute the basis for the research, the assumptions and results of which will be described below.

Methods and research design

Based on the assumptions of a social model of disability (Oliver, 1990), a qualitative study was conducted, aimed at identifying opportunities to create optimal conditions for employees with autism to improve their well-being in the workplace supporting overcoming existing barriers. The focus was placed on modifications within the four key problem areas mentioned earlier (communication, time management, stress management, and sensory sensitivity). The opinions were gathered from interviewees whose day-to-day tasks include therapy and cooperation with individuals on the autism spectrum. The interviewees were chosen by non-random, purposive selection, using the snowball method. The selection criteria for the research sample included broad experience, proficiency, and extensive knowledge in the field in identifying the needs, limitations, and strengths of individuals with autism. Interviews were conducted with a group of 21 people. The interviewees were specialized support staff (special education school teachers, therapists - including one who received an autism diagnosis, psychologists working with adults on the autism spectrum), CEO of a company supporting and providing vocational training and recruitment for individuals with autism, CEOs and managers of companies employing individuals with autism, job trainers/consultants, and a parent of an adult job seeker with autism. The average experience of the interviewees working with individuals with autism was 12 years (4 shortest and 20 longest). The respondents were

recruited mainly from Poland and also from Spain, Australia, and Canada. The diversity of the sample is an outcome of the main selection criterion, which was a broad expertise in the field (information-rich cases that allow for an in-depth exploration of a broad range of experiences), not background or geographical location. Specific details of the research sample can be found in Table 1.

/Table 1 here/

An in-depth interview was employed (Kvale, 2007). The interviewees were asked to share their opinions and recommendations concerning necessary modifications (both workplace accommodations and managerial practices), within the four key areas mentioned earlier, identified by the author after the literature review. Based on these assumptions, participants were asked how to improve the well-being of workers on the autism spectrum within each problem area, both with the use of DT and non-technological solutions. All interviews were conducted in 2020; ten of them were individual, four were conducted with two interviewees, and one with three interviewees. Each interview lasted approximately 35 minutes on average. Due to limitations related to the COVID-19 pandemic and travel restrictions, some interviews were conducted remotely. All were recorded and then transcribed using template analysis (King *et al*., 2018). The transcription yielded a total of 103 pages.

Research results

The necessary modifications indicated by the interviewees cover both the physical work environment and managerial practices aimed at supporting overcoming limitations in the four problem areas mentioned above. During the analysis, among the four main proposed themes, minor subthemes were identified. The set of possible accommodations within specific themes and subthemes is presented in Table 2.

/Table 2 here/

Effective communication

Among the solutions supporting quality and effectiveness in interpersonal communication, communication based on non-direct and non-verbal contact should be mentioned first. These include solutions such as the electronic-mediated form of communication as emails, online communicators, chats, discussion forums, chatbots, online forms and online platforms. The advantages of such solutions were described by one of the respondents:

> *"I think that it's helpful because it gives them another way to express themselves. It doesn't provide anxiety, it doesn't provide any angst or stress. If individuals don't have these easily accessible in the workplace, they have questions and they never get the questions answered. Before you know it,*

they haven't been able to do their job and they're suffering like repercussions from not being able to do the work but also not knowing how to seek assistance. So I think it's essential." (R8)

Furthermore, the character of interpersonal contact, including its frequency and intensity, both with the managers and other team members, should be adapted to the individual preferences and needs of the employee. In addition, if necessary, direct contact may be limited to only one person (manager or team member). Written agendas before the meeting and minutes after meeting are also recommended.

Whereas individuals with autism face difficulties understanding metaphors and non-verbal communication, another critical issue is improving the intelligibility of messages. When exchanging information, there is a need to be clear and literal; thus, simple and concise but precise communication should be used. Similarly, the commands need to be clear and understandable and accompanied by regular, constructive, and honest feedback.

Another good idea is to follow verbal instructions in written form, and as part of written communication, also in visual forms: visual schedules, charts, tables, pictograms, emoticons, and instructional pictures. These instructions should be anchor-like, detailed, and take the form of guides and manuals with which employees could return to and consult.

All of these could also be supported with applications that enable the transfer of handwriting to a word processor, counteracting eventual limitations in graphomotorics and applications converting speech into text. On the other hand, speech synthesizers changing text to speech could also be helpful for employees facing difficulties with intelligible speech.

Time management, task prioritizing, and work organizing

According to the statements of the respondents, problems concerning time management or task prioritization could be solved with applications for computers and mobile devices in the form of various types of time structuring tools, calendars, task lists, reminders, or alerts providing a clear scope of duties and sequence of tasks and informing employees involved in a given project that the deadline is approaching. Another solution may be an interactive shared to-do list for managers and employees aimed at job progress monitoring within a day/week/month work plan. Below is example of the opinion of one respondent on such solutions:

"I think it's a fantastic solution. I think it's imperative, having an app that has all instructions and all the tasks. It's so important. It provides the structure but not only structure. It provides safety for

the individual as well. It gives them barriers to know what the day would look like, what they are required to do, and be able to be more accountable. I think that would be a really good thing, definitely, for the workplace." (R10)

Given the specific characteristics of the labor force on the autism spectrum, a flexible approach is required, based on awareness of diverse needs, tolerance, and climate for inclusion. A manifestation of this may be a flexible approach to monitoring working time and being task-oriented rather than evaluating time spent working (e.g., enabling 4 hours of intensive and efficient work as an equivalent of 8 hours). Being open to part-time work is also beneficial when full-time commitment could be too exhausting. Finally, all forms of remote work or hybrid work limiting direct contact and unnecessary social interactions may also be beneficial.

In addition to the flexible approach in terms of working hours, there is also a need to introduce a structure where possible. For example, if an employee with autism chose a specific working mode based on preferences, changes in this routine could be highly stressful for this person. Another issue is providing regularity and rhythm in assigning tasks and assessments, together with transparent responsibilities, work structure, and work organization.

The support of co-workers and supervisors is also critical, especially in the initial period of work during onboarding. Real-time job assistance can be carried out by a buddy, mentor, or job coach assigned (also when using a dedicated application) or as part of support circle meetings.

Stress management and emotion control

Another topic taken up by the research participants was the issue of coping with stress. In stress detection and monitoring, which is difficult for people on the autism spectrum, a real-time stress level increase measurement could be an effective solution. The increase of a stress level can be notified to the user by a dedicated mobile device application or wrist-worn device. The mentioned application could also collect and analyze data on stress triggers to identify and avoid them in the future. This could be supplemented with stress awareness training. As stated by one of the respondents:

"For this device to be helpful, some strategies must also be developed. For example, in the case of a problem situation, the person on the spectrum wants to react somehow but also may forget which solution to choose due to the increase in stress level. This device could prompt what to do in this situation, whether to go to a chill room or use a specific relaxation technique." (R7)

The further development of this concept could include developing a comprehensive application, collecting data on the psychophysical condition, connected with a planner, with the possibility of contact with a job coach or buddy, and allowing collecting and analyzing information on stress triggers.

Stress measurement could also be combined with training in workplace stress reduction using appropriate relaxation techniques and stress-reducing activities. To make it easier to express emotions, there is also the potential for exploring a non-verbal way of conveying emotions, e.g., emoticons or keywords established to inform about the perceived increase in stress or discomfort. At the same time, to reduce stressors, it is worth introducing solutions aimed at adjusting the optimal environmental parameters after detecting an increase in stress levels, enabling dynamic customization of temperature, humidity, noise, smell, and sunlight exposure.

Sensory sensitivity

According to the interviewees, due to the greater sensitivity to sound, visual, or olfactory stimuli, it is also worth providing conditions to overcome these limitations. Every employee should have an individual workstation or space, preferably avoiding "hot desks" or "open spaces," and enabling the arrangement of the working environment according to personal preferences, of course, as far as conditions allow. There should also be a relaxation area in the office, separate "chill room". As an example illustrating the importance of limiting external stimuli, I quote one of the respondents:

> *"From my perspective, the issue of overstimulation in society at this point is so big that for me the chill room should be a systematic solution for everyone. Not only people with autism. I am a supporter of reducing the number of stimuli in the entire population." (R14)*

For people working on a computer, the simplest protection against overstimulation would be headphones with mechanical or electronic sound damping (active noise canceling system) and "silent" computer keyboards, the use of which does not involve clicking. Additionally, in case of comorbid conditions related, e.g., to sight problems, the solution may also include computer monitor adjustments and customized settings: contrast, brightness, color saturation, high quality for magnification, or high contrast screens. A profiled computer mouse is also an option for employees with impaired psychomotor coordination.

Discussion of results

Bearing in mind the very diverse characteristics of people with autism, and thus their varied needs, it is necessary to be aware that the proposed solutions within the four problem areas should be tailored to the level of support

needs, based on the degree of independence. There is no perfect solution for everyone. This is well illustrated by the statement of one of the respondents:

> *"Every autistic person is different. It is very important to have an individual conversation, not necessarily face to face, and evaluate from time to time whether the given forms of support are beneficial and meaningful. Some people need more support in several areas, while others only need only minor changes and need no special treatment". (R13)*

From the set of proposals presented above, we should choose those that best fit the nature of the organization and the needs of employees, according to their individual preferences. What is important, modifications and interventions should be based on relations with other employees, not only with technology, which should be just a facilitator of these relations. Therefore, electronics should not completely replace direct communication but coexist and support it when necessary. As far as the measurement of stress is concerned, it should be accurate and not cause the impression of being dependent on the stress notification. At the same time, to reduce stressors, it is worth introducing "smart office" solutions (Alberdi *et al.*, 2018) aimed at adjusting optimal environmental parameters after detecting an increase in stress levels, enabling dynamic customization of ambient environment parameters.

On the other hand, the environment does not have to be "sterile." Individuals with autism should be assured a possibility to face adequate development challenges at the optimal level of stress and adapt to it as much as they can, to successfully and permanently introduce themselves into the labor market. The result will be their development by leaving the comfort zone, therefore, the balance between stimulating development and reducing stress is so important. Employees with autism should be able to become their self-advocates and take care of themselves in the work environment. This fits into the emerging strength-based approach to mental disorders (Wiklund *et al*., 2020) and neurodiversity (Wiklund *et al*., 2018), where a focus is placed on a person's assets rather than weaknesses.

The findings may also be interpreted through the lens of the psychological safety concept (Newman *et al.,* 2017), which was defined by Edmondson (1999) as a shared belief about whether it is safe to engage in interpersonal risk taking in the workplace. Within such an environment, employees respect each other's competence, feel that their colleagues will not reject people for being themselves, have positive intentions for one another, and can engage in constructive conflict or confrontation (Edmondson, 1999). As a consequence, it leads to interpersonally risky behaviors, such as open communication, engagement, voicing own concerns, and seeking

greater feedback (Pearsall and Ellis, 2011), which can influence a wide range of workplace outcomes (Edmondson and Lei, 2014). This approach, because it enables the creation of favourable conditions for introducing change, may facilitate the necessary changes aimed at the elimination of barriers identified according to a social model of disability (Oliver, 1983) such as environment, technology, culture, and attitudes. These barriers could be overcome with the use of technology-based material accommodations within work environment (including assistive technology devices), combined with non-technological modifications, reshaping organizational processes with supervisors and coworkers' interactions, and supporting an inclusive and tolerant approach.

Autism-supportive managerial practices coupled with the proper use of technology can contribute to overcoming the cultural and attitudinal barriers mentioned in the social model of disability. For example, solutions supporting effective cooperation between employees, e.g., real-time online support by a job coach or limiting challenges related to sensory sensitivity by enabling employees to work in headphones, can become a facilitator of positive changes in the process of transforming the organizational culture to make it more inclusive and, consequently, more aware of autism. Practices focused on increasing awareness and promoting an inclusive and tolerant approach (e.g., involving diversity training, autism awareness training, etc.) could potentially influence the whole organizational culture and then, hopefully lead to permanent changes in neurotypical employees' attitudes. In this way, they can influence the dynamics of these positive changes. Prior research by Hicks-Clarke and Iles (2000) proved that a positive climate for diversity does impact significantly on a range of career and organizational attitudes and perceptions. Therefore, appropriate autism-supportive managerial practices based on technology can potentially contribute to changing cultural and attitude-related barriers according to a social model of disability and, consequently, cause the entire organization to attain organizational maturity to support the employability of individuals with autism.

The organizational maturity concept has evolved from the original process maturity framework, which was used to improve processes in software organization (Humphrey *et al*., 1987), and became the basis for creating the Capability Maturity Model (CMM). It defines a mature organization as possessing an organization-wide ability to manage development and maintenance, and where a disciplined process is consistently followed because all participants understand the value of doing so and infrastructure exists to support the process (Paulk *et al.*, 1993). Wieczorek-Szymańska (2017) proposed a model of organizational maturity in diversity management and assumed that the more proactive the attitude of managers towards diversity, and the stronger strategic importance of the diverse workforce, the closer the organization is to mature-oriented diversity management. Furthermore, Lundy et al. (2021) constructed CMM to guide diversity & inclusion decision making and support continuous

improvement. To the authors knowledge, so far, this perspective has not been used in the context of autism and employment. Barriers identified according to a social model of disability are not novel, but the concept of overcoming these barriers with the use of technology-based material accommodations combined with autism-supportive managerial practices, which can lead to organizational maturity to support the employability of individuals with autism, is a novel approach.

All this can be done by the successful implementation of solutions aimed at overcoming challenges in the four aforementioned problem areas of effective communication; time management, task prioritization, and organization of work; stress management and emotion control, and sensory sensitivity. Together, they can contribute to the improvement of wellbeing and, consequently, also to the improvement of work performance and job retention of employees with autism, making the contemporary work environment more inclusive for this group of people.

Support and understanding on the part of the employer is a key success factor of such interventions, primarily since some individuals on the autism spectrum work for the first time or have poor work experience. Any introduced solution supporting individuals on the autism spectrum should also be available to all employees, including neurotypical staff. Many of the proposed modifications, such as flexible working hours, working with headphones, or personalization of the workspace, could be a real improvement for all employees and translate into improving working conditions with an associated positive impact on their well-being. This is confirmed by the findings reported by Krzeminska *et al.* (2020), according to whom most types of workplace adjustments requested by autistic and non-autistic workers were similar for representatives of both groups.

There are also some limitations in using work-related practices based on AT, which were described above. These include, first of all, the costs related to the implementation of the newest technology-based interventions, which are usually high (de Witte *et al*., 2018). Fortunately, the cost of purchasing technological devices decreased over time and became more accessible in recent years (Seaman and Cannella-Malone, 2016). Another way to reduce the costs is adapting already existing technologies available for the general population for assistive purposes (O'Brolchain and Gordijn, 2018). The next important risk is a potential threat of stigma of AT users (Parette and Scherer, 2004) based on their ties with the technology products (Silvers, 2011). To counteract this, as already mentioned, it is worth making solutions available (both technological and non-technological) to all employees, including neurotypical ones, to avoid the feeling that a certain group has privileges.

In addition to its advantages, diversity can also cause misunderstandings and conflicts (Roberge and van Dick, 2010). A certain level of tolerance and awareness is required in neurotypical employees. Enhancing inclusive organizational cultures with a diversity climate can be achieved with appropriate disability diversity training (Phillips, 2016) for all managers and staff. As managerial practices can shape the organizational ethical climate (Parboteeah *et al*., 2010), leaders with transformational qualities are highly needed (Hayward *et al*., 2019).

Implications and limitations

Previous studies in the field differ in the scope, extent, technology used, or level of individuals' support needs. Thus, the aim of the present study was limited regardingthe target group and the scope of research. It aimed to analyze the technology-based and non-technological opportunities to create optimal conditions for individuals on the autism spectrum with lower support needs to work in a contemporary workplace and enhance their well-being. To the author's knowledge, this is the first study to focus on this perspective, and referring to the assumptions of the social model of disability.

From the point of view of work practice, there are various potential benefits of employing individuals with autism. First, by modifying the work environment and reorganizing the way we work, it is possible to use the unique skills of individuals on the autism spectrum due to their specific characteristics arising from different cognitive styles and prevent talent shortages or underutilization (Jessurun *et al*., 2020). Furthermore, employers could benefit from their special interests (Goldfarb *et al.,* 2019), memory ability (Szulc *et al*., 2021), strong detail focus (Armstrong, 2010), systemizing skills, and information cataloging abilities (Baron-Cohen *et al*., 1999), long-term recurrent tasks performing and tolerance for monotonous actions (Tomczak, 2021). As a result, the productivity of individuals with autism could lead to improved business performance and firm competitiveness (Austin and Pisano, 2017). Additionally, this could also be a path to create a positive image of the company as part of corporate social responsibility (CSR) practices and employer branding (EB) actions. In addition, work activity constitutes an essential part of the rehabilitation process of the population with autism, fostering a social integration that is beneficial for both individuals with autism and society (Tomczak, 2021).

Despite its advantages, consisting of carrying out a cross-sectional analysis of the problem, the main limitation of the study was that only one of the interviewees was diagnosed with autism. Thus, further research should be carried out to implement the solutions mentioned above in practice, test them in real working conditions by employees on the autism spectrum, and then evaluate their actual effectiveness. When designing such experiments, it should be assumed that user experience should be the central component of supporting solutions

(MacLachlan and Scherer, 2018). At the same time, as Moore and Piwek (2017) emphasized, scholars will need to place ethical issues at the heart of research on sensory tracking technologies in workplaces that aim to regulate employee behavior through wellness initiatives. Furthermore, the respondents were recruited from different countries, so they represented different legal and cultural contexts, however, in the case of the collected responses, no major differences were found in the statements of the interviewees. Perhaps because the nature of the examined problem is universal, transcending national and cultural boundaries. It most certainly requires further comparative studies involving a larger number of participants from different countries and backgrounds.

Conclusions

There is a need to provide affordable and user-experienced assistive technology solutions tailored to employees with autism and accompanied by appropriate managerial practices, covering four main areas of support: effective communication; time management, task prioritizing, and organization of work; stress management and emotion control; and sensory sensitivity. All this could lead to overcoming existing barriers and limitations, and not only to an increase in employment in individuals with autism, but also to an improvement in the job performance of already employed. Furthermore, modifications focused e.g., on early stress detection or limiting sensory overwhelm, could improve the long-term well-being of all employees, both on the autism spectrum and neurotypical ones.

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Table 1. Detailed information on the research sample, N=21

Characteristics		Number of respondents
Gender	Female	14
	Male	7
Autism	Yes	1
	No	20
Country of origin	Poland	17
	Canada	2
	Spain	1
	Australia	1
Role	Therapist	10
	Job trainer/consultant	5
	Employer	5
	Other	1
Interview form	Online	8
	Direct	13

Source: Own study

Table 2. Possible modifications to the work environment and managerial practices based on interviews

The character of workplace challenge	Possible modifications	
	Technology-based solutions	Non-technological solutions (managerial practices)
Effective communication	Communication based on non-direct and non-verbal contact	
	Electronic-mediated forms of communication (e.g., emails, chats, chatbots, online forms)	Flexible forms of contact with the manager and team members Direct contact limited to one person only Meetings in small groups Written agenda before the meeting, and minutes after meeting
	Improving the intelligibility of messages	
	Speech-to-text and text-to-speech applications	Precise communication Verbal instructions followed by written form Written communication using visual forms (e.g., visual schedules, pictograms) Regular, constructive, and honest feedback
Time management, task prioritizing and work organizing	Time management and task prioritizing	
	Time management and task prioritization applications Time structuring tools (e.g., electronic calendars, reminders, alerts) Job progress monitoring applications (e.g., interactive shared to-do lists)	Clear day/week/month work plan A clear scope of duties and sequence of tasks Support in setting task priorities Checklists of tasks
	Organization of work	
	Application for monitoring own activities, with access to the support of a mentor/ coach/job trainer Remote work Hybrid work	A flexible and tolerant approach Flexible working hours, or part-time work Individual work and tasks Transparent and task-based work structure Clear rules of operation, avoiding unwritten rules Regularity and rhythm in meetings, assigning tasks, and performance assessment Buddy/mentor/job coach assistance Providing support circles
Stress management and emotion control	Stress monitoring	
	Real-time multi-sensor based stress level monitoring and up-to-date notification Collecting and analyzing data on stress triggers	Stress awareness training
	Stress coping strategies	
	Dynamic adjustment of ambient environmental parameters after detecting an increase in stress level	Stress coping training and stress-reducing activities Non-verbal ways of conveying emotions (e.g., emoticons or keywords informing on the perceived increase in stress level)
Sensory sensitivity	Computer monitor settings adjustment, blackout cover/filter Profiled computer mouse Headphones Silent computer keyboards	Comfortable office environment, small spaces Individual work stations, avoiding “open spaces” and “hot desks” Separate ”chill room” with no stimuli

Source: Own study