

Game-Based Assessments vs Interviews: Interview Anxiety and Performance Among
Individuals with and without ASD

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Abstract

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In the workplace, a substantial portion of life is dedicated to work, offering sustenance, social connections, and individual identity. However, individuals with autism spectrum disorder (ASD) face significant underemployment globally despite possessing various skills. Traditional interview-based selection methods often create systematic bias against ASD individuals due to social skill deficits and heightened anxiety. This study contrasts three assessment approaches: asynchronous video interviews (AVI), video conference interviews (VCI), and game-based assessments (GBA). The primary aim is to mitigate bias using GBA. Anxiety levels were measured with an adapted version of the Measure of Anxiety in Selection Interviews (MASI). A mixed ANOVA assessed performance and anxiety differences between ASD and non-ASD groups across the three assessment types. Results showed no significant differences in anxiety levels across assessment types for both groups. Performance results indicated individuals with ASD performed significantly lower in VCIs compared to non-ASD individuals but better in AVIs and GBAs.

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Introduction

In today's economy, a large part of our life is spent at work. Apart from financial motivations, employment is integral to the American self-concept and life. According to Solomon (2020), jobs are essential sources of friendship, identity, and achievement. A meaningful job adds structure to life and provides financial stability. A stable job also improves overall well-being by 30% compared to people who are not employed (Helliwell et al., 2018). Hence, the effects of employment can extend way beyond the bank balance, as it tends to impact social status and even personal validation (Solomon, 2020). One of the under-represented groups in terms of employment are those who fall under the heading of neurodivergent. This category includes people with dyslexia, autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD) and even obsessive-compulsive disorder (OCD). The national autistic society indicates that there are more than 700,000 people in the UK who have autism. A survey by Statistics Canada (2019) indicated that 1 in 50 children and adolescents between the ages of 1 to 17 are diagnosed with ASD. Yet, people with ASD are often underemployed internationally. When it comes to employment for people with Autism and those with high-functioning Autism (HFA)¹, it presents a gloomy picture. According to the Employment Equity Act (1995) the focus is on promoting workforce diversity and ensuring the representation of members from various protected groups, including individuals with physical and mental disabilities. It is important to note that these protected groups are established based on human rights and anti-discrimination laws. Therefore, individuals with disabilities, including those with ASD are entitled to equal

¹ This thesis primarily addresses individuals historically designated as High functioning Autism (HFA) yet recognizing the critique and potential limitations associated with this label, I have adopted the term ASD throughout this manuscript.

opportunities under this law. This creates a moral duty for organizations to ensure they are not discriminating or being biased towards a particular group.

Ballaban et al. (1996) conducted a study in the USA on a sample of 45 adults with ASD, which revealed that only 27% of people from the sample had some work activity. Whereas only half were competitively employed, the remaining half were employed in supported positions such as sheltered workshops. A similar situation was also seen in Canada, where 45% of people with ASD have never been employed (Eaves & Ho, 1996). The situation did improve in the United States America but only slightly, where research by Roux et al. (2015), indicated that 58% of individuals with ASD are employed. The 2022 Canadian Survey on Disability by Public Health Agency of Canada (2023) revealed that 27% of Canadians aged 15 and older have been diagnosed with a disability amongst which 24.1% are working adults between 25-64 years. The survey revealed significant changes in the labour force status of persons aged 25-64 years with and without disabilities. In 2022, 61.8% of persons with disabilities were employed compared to 77.8% without disability. In contrast, data from the same survey in 2017 showed that employment rates for people with disability was 59.3% compared to 80.1% without disability. Unemployment among persons with disabilities rose from 5.4% in 2017 to 7.8% in 2022. Although there has been some improvement in the situation for people with ASD, there is a long way to go before most organizations become inclusive towards individuals with ASD.

Extensive research has been done by the Center for Disease Control and prevention (2018) which indicated that in 2014 out of 18,000 individuals with ASD, only 60% of them were in state-funded vocational rehabilitation programs which attained employment. Even those employed are often given part-time work, and their median salary is only \$160 USD weekly. For comparison, the median usual weekly earnings full-time wage and salary workers in the United States in 2014 were approximately \$870 USD for men and \$719 USD

for women (U.S. Bureau of labor statistics, 2019). This stark difference highlights the economic disparity faced by individuals with ASD in the workforce. These disheartening figures underscore the potential disadvantages faced by individuals with ASD. It is essential to note that social skill impairment is a central feature of ASD, where this often involves challenges in understanding gestures, eye contact, facial expressions and even tone of voice (Autism Speaks Canada, 2023). Hence, an intrinsic barrier for people with ASD lies in the form of deficient social skills, due to which they are ill equipped for interviews. Running alongside this body of literature is a growing body of evidence that, to put it simply, traditional interviews are not well suited for evaluating individuals with ASD (Willis, et al., 2021). According to Scott et al. (2017) individuals with ASD possess a variety of talents and can effectively fulfill many job descriptions. However, their challenges with social skills often hinder their success in interviews and hinder their employment prospects (Scott, et al., 2017). Hensel (2017) echoes similar sentiments, highlighting that autistic individuals tend to possess valuable skills such as a strong work ethic, heightened attention to detail, and analytical and critical thinking skills, all of which can bring significant benefits to an organization. Furthermore, Ali et al. (2011) propose that neurodiverse individuals are similar to neurotypical individuals in terms of value they find in work, and their desire to work at a comparable rate.

To ensure a fair selection process and prevent discrimination for people with ASD, various measures can be implemented. One such solution is the utilization of game-based assessments (GBA) for people with ASD. These assessments can play a crucial role in providing equal opportunities during the selection process. The current study compares the performance of both the general population and autistic individuals on three different selection methods: video conference interviews (VCI), asynchronous video interviews (AVI), and GBA. Specifically, I examine the impact of anxiety on performance in interviews and

GBA and explore whether GBA can help reduce anxiety levels and improve performance for individuals with ASD. The study employs a repeated measures design where participants in both groups (ASD and Non-ASD) take part in all study conditions.

By exploring GBA as an alternative selection method, this research aims to facilitate a fair and unbiased selection process that promotes the inclusion and wellbeing of Autistic individuals in the workforce. Ultimately, the findings of this research may advance the economic and social wellbeing of the candidates by promoting a more inclusive and diverse workforce, reducing discrimination, and promoting equal opportunities for all individuals, including those with ASD.

Literature Review

Understanding ASD

To delve deeper into the issues people face on the spectrum, it is essential to understand their symptoms. *Autism Spectrum disorder* is a complex developmental disability that often appears during the first three years of life. However, it is worth noting that for some people, particularly those assigned female at birth (AFAB), may go undiagnosed until adulthood (UCLA Health, 2023). Autism Spectrum disorder is a neurological condition that affects the brain's normal functioning, especially regarding social interaction and communication skills. Both adults and children with Autism tend to show difficulties in verbal and nonverbal communication and social interaction (The Autism Society, 2022).

A study by Howlin (2000) indicated that the social communication deficits with people on the spectrum which appear in childhood, tend to continue into their adulthood and might have significant outcomes. The verbal communication challenges include poor reporting of events, difficulty engaging in conversations, and shorter sentences.

Individuals with High functioning autism (HFA) fall under the spectrum of ASD, but they tend to have abilities to handle basic life skills and live and work independently (Roybal,

2020). Much evidence suggests that people with HFA can work successfully in a wide variety of jobs and can maintain competitive employment (Gal et al., 2015). Similarly, Scott et al. (2017) also agreed that individuals with ASD have specific skills, which, if applied to the right job, may lead to those individuals being cost-effective and productive employees for the organization. Individuals with ASD tend to have a higher degree of dependability, have patience for repetitive work along with a superior concentration (Scott et al., 2017). If used correctly, these skills can become assets for organizations.

While the specific list of jobs may not be essential to mention in all contexts, it can serve as illustrative examples of roles where individuals with ASD often find success. Such positions may include assembly line manufacturing, software development, computer programming, and laboratory work. These jobs, characterized by their repetitive nature, may play to the strengths of individuals with ASD, as they can excel in such environments (Solomon, 2020). However, it is vital to recognize that job suitability can vary among individuals with ASD, and it's essential to consider individual preferences and strengths.

It can also be speculated that some businesses can benefit from hiring individuals with autism as they have different perspectives and a unique way of thinking and problem-solving than those who are considered neurotypical. For instance, research by Jeppesen and Lakhani (2012) on crowdsourcing challenges revealed individuals who excelled at solving such problems often exhibited distinct social traits compared to others attempting to solve the same challenges. Lastly, Individuals with ASD also demonstrate traits such as honesty and integrity (Hillier et al., 2007); which might be vital for many organizations. To help individuals with ASD, it is important to provide a good person-job fit that can help both the employer and the employee.

Challenges with Employment

Many researchers have indicated that individuals with Autism are underrepresented in the workforce. Roux et al. (2015) have indicated that only one half of individuals with ASD have ever worked following high school. Similar results were shown in a Canadian study by Jennes-Coussens et al. (2006) which indicated that such individuals had lower social and physical quality of life along with less positive employment experiences.

Individuals with ASD have difficulty in creating a resume that highlights their skills and experiences (Gal et al., 2015). One explanation for the low employment opportunities for such individuals can be the traditional selection methods which most HR managers use: interviews. They also tend to face obstacles in contacting the potential employer through the telephone or talking about the "right" things in an interview (Gal et al., 2015). Solomon (2020) also agreed that interviews at the core are a social test, as interviews not only assess past experiences to demonstrate high intellect, but also require social competency. Interviews require focused conversation, listening without interrupting, handshakes, and a good understanding of facial expressions. However, for many people with ASD, these behaviors might be challenging to enact or learn (Solomon, 2020). The interview stage might be the greatest challenge for people with ASD and this explains their high rate of unemployment (Roux et al., 2015).

Additionally, research by Kim (2014) has also suggested that individuals with autism are incredibly shy and quiet, hence this might turn out to be an issue of self-advocacy and confidence when appearing in a job interview. Excelling in job interviews not only requires professional proficiency and knowledge but also an understanding of various social demands such as a certain code of behavior or an understanding of the employers' expectations (Gal et al., 2013). Individuals on the spectrum also face social interaction challenges where they might have trouble in understanding the core meaning of communication and difficulty in initiating or maintaining conversations (Wetherby & Prizant, 2000).

A study by Finn et al. (2023) on 10 Autistic individuals also indicated that due to the social nature of job interviews, they often become a barrier for employment even if the individuals felt that they had potential to do the job. One individual in their study reported that the job interview process was a draining, unfair, tricky, awkward, and uncomfortable process. Another individual said that traditional job interviews set them up for failure. These behavioral, social and communication differences with people on the spectrum often turn out of be a barrier towards professional success in the selection process for people with ASD. This also indicates that the traditional job interview is not ideal for autistic individuals.

Interview Anxiety and Performance

Another factor to consider is the interview-specific anxiety which the general population faces. Since the interviewer is typically someone the candidate doesn't know, it has been found to be anxiety provoking (Ayres et al., 1993). Another factor which causes employment anxiety has to do with the applicants' lack of control over the situation (Jones & Pinkney , 1989). Interview anxiety includes communication, performative, behavioral and social components (McCarthy & Goffin, 2004). These specific facets are believed to present challenges for individuals with ASD as evidenced by their difficulties in these areas.

Anxious interviewees typically receive lower interview scores than their less anxious counterparts (Schneider et al.,2019). A meta-analysis by Powell et al. (2018) found a correlation of -.19 between overall interview anxiety and interview performance. Specifically, social anxiety can lead individuals to focus excessively on themselves, making them seem less warm, likeable and assertive. This form of anxiety is also linked to lower levels of self-disclosure (Clark & Wells, 1995), resulting in less detailed responses during interviews. Therefore, several mechanisms contribute to the interference of anxiety with interview performance, with a moderately negative relationship overall (Powell et al., 2018).

Consistent with previous research, Schneider et al., (2019) also found a negative relationship between interview anxiety and performance, where more anxious interviewees received lower scores on the interview. In their study, communication anxiety and social anxiety were most predictive of interview performance. However, interview anxiety was not significantly related to overall job performance, nor did it predict job specific proficiency (Schneider et al., 2019). This suggests that while interview anxiety negatively impacts interview performance, it does not necessarily predict lower job performance once hired (Powell et al., 2018).

Furthermore, research on Autistic individuals and their experiences in job interviews in Australia (Finn et al., 2023) showed that Autistic individuals reported that job interviews were a source of stress and anxiety for them. A few participants reported that they get anxious weeks before and after the interviews. It was reported that Autistic individuals often resort to hiding their autistic characteristics during interviews, such as forcing or feigning eye contact, monitoring their body language and scripting conversations. These efforts to suppress natural behaviors and mimic non-Autistic behavior led to increased anxiety and stress during the interviews. One participant also said that job interviews often lead to them feeling exhaustion and ‘Autistic burnout’ (Finn et al., 2023).

These findings highlight the importance of considering interview anxiety, especially communication, social and performance anxieties, in evaluating interview performance. High anxiety levels can lead to lower scores in job interviews, despite the potential for superior job performance when hired (Powell et al., 2018). This places individuals with Autism, who already struggle with social and communication problems, a significant disadvantage during job interviews.

Asynchronous Video Interviews and Video Conference Interviews

Due to technological advancements, there are now many alternatives to face-to-face interviews. Two of those include; VCI such as through Zoom or Google Meet (Sears et al., 2013), or AVI which are also called digital interviews. In VCIs, the interviewer and interviewee are communicating in real time, like a traditional face-to-face interview. Whereas, in AVIs candidates are shown pre-defined questions and they must record their answers through webcam which are later evaluated by interviewer (Brenner et al., 2016). In my research I used both AVIs and VCI. The rationale behind using these interviews is described below.

Video Conference Interviews

According to the research conducted by Basch et al. (2021) VCIs tend to exhibit lower quality of eye contact and reduced social presence (i.e., an impaired feeling of the physical awareness of one's conversation partner) as compared to face-to-face interviews. This lower social presence can be attributed to the challenges of making direct eye contact when using a computer and webcam.

Individuals with ASD commonly experience challenges related to social communication, including difficulties in maintaining eye contact, often resulting in a tendency to avoid direct eye contact (Auyeung, et al., 2015). In the context of VCIs, this aspect might present a unique advantage for people with ASD as compared to face to face interviews. While it is true that individuals with ASD may still encounter difficulties with making eye contact during the video conference interviews, the reduced social presence in these might be less overwhelming and provide a more controlled environment for them. Whereas, in face-to-face interviews, the pressure to engage in direct eye contact with interviewers might escalate their anxiety levels, negatively impacting their performance.

On the other hand, due to the lower quality of eye contact and social presence in VCIs (Basch et al., 2021), the “virtual barrier” of a screen can provide a sense of distance that might be more comfortable for people with ASD. This interview setting might alleviate some of the anxiety associated with direct eye contact and in-person social interactions, potentially allowing them to demonstrate their skills and abilities more effectively. Nonetheless, as VCIs still entail a social component, where the participants must engage in a conversation with the interviewer. A certain level of communication, social and behavioral anxiety might remain. Hence, it is crucial to acknowledge that while VCIs might ease some of the challenges, a degree of anxiety will persist for individuals with ASD in VCIs. Given these considerations, the rationale for incorporating Asynchronous video interviews (AVIs) as the next assessment in this study becomes evident.

Based on literatures reviewed above, I propose the following hypothesis:

H1: Individuals with ASD will report higher levels of anxiety in VCI compared to those without ASD.

H2: Individuals with ASD will demonstrate lower performance in VCI compared to those without ASD.

Asynchronous Video Interviews

In the recent years, due to advancement in technology, many companies are moving towards AVIs for their selection process. In the paper by Lukacik et al. (2022) it was suggested that AVIs tend to be lower in terms of social bandwidth which is the extent to which relevant communication and information is exchanged. Additionally, there is lower interactivity between the interviewer and interviewee in AVIs. In traditional face-to-face interviews social presence is high where the interviewer and interviewee meet and interact, and there are verbal and nonverbal cues. On the other hand, in AVIs the social presence is low (Salimian Rizi & Roulin, 2023).

Another relevant feature which influences applicants experience in interviews has to do with interview anxiety. Lukacik et al. (2022) proposed that certain AVI designs might reduce interview anxiety in applicants. These factors include giving more preparation time to the applicants to formulate their responses which would reduce communication and performance anxiety. Whereas, to reduce behavioral and performance anxiety, participants should be allowed to complete their interview over an extended period or be given a choice of interrupted interview completion. They propose that with interrupted interview completion participants will have the chance to complete their interview when they feel well rested or are able to perform according to their ability. Lastly, communication anxiety can also be reduced when participants are allowed to record a longer length of response such as if they are given 3 minutes to record their response over 1 minute, they might feel that they can express themselves more. Hence, Autistic people might perform better in AVIs than video conference interviews particularly if designed using the elements as described above. Since in video conference interviews there is still an element of social interaction between the interviewer and interviewee, I propose that interview anxiety would be lower in AVIs than video conference interviews for individuals on the spectrum.

Another advantage of AVIs, as proposed by Lukacik et al. (2022) is that organizations can allow participants to choose to complete the interview at their own pace, take breaks or leave the AVI platform and return later. While not all candidates may utilize this option, having the flexibility to choose such accommodations could reduce the fatigue often associated with face-to-face interviews and enhance the perception of having a fair opportunity to perform. There is preliminary evidence which shows that applicants can receive higher performance ratings in AVIs than VCIs (Langer et al., 2017). For individuals with ASD, this flexibility and control over the interview process might make AVIs less overwhelming as opposed to face-to-face interviews or VCIs (Fisher et al., 2024). The virtual

environment could offer a sense of comfort and familiarity allowing them to perform closer to their true capabilities.

However, there are still certain factors which might lead to individuals with Autism being rated negatively in AVIs. To the best of my knowledge, no other research has been done on bias against individuals with Autism in video interviews except by Whelpley and May (2022). Their study compared job interview performance of individuals with Autism to neurotypical individuals in a mock videotaped job interview and a transcript condition. Candidates were rated by interviewers where they watched the interview (video condition) or read the interview transcripts without being aware of the neurodiversity. Their results indicated that neurotypical individuals were rated higher than the ASD participants in the video interviews. However, when there were no visual and social cues such as in the transcript condition, individuals with Autism were rated more positively (i.e., being given overall higher scores and rated as more qualified). In video conditions, Autism candidates were rated as significantly less trustworthy, likeable, and attractive and more awkward. Additionally, despite being rated as qualified as the neurotypical candidates, their overall ratings were low in the video condition (Whelpley & May , 2022).

Based on literatures reviewed above, I propose the following hypothesis:

H3: Individuals with ASD will report lower levels anxiety in AVIs than in VCIs.

H4: Individuals with ASD will demonstrate better performance in AVIs than in VCIs.

Hence, based on the above literature, it is evident that there is a need to explore alternative assessment methods for a more equitable selection and accommodation for individuals on the spectrum. Considering the potential biases within AVIs, I propose that a game-based assessment (GBA) might represent a fair option for a neurodiverse selection process.

Traditional Selection Tests and SJT

Situational judgement tests (SJT) not only determine behavioral tendencies, understanding how the individual will behave in certain situations (“what would you most likely do?”) but also measure job knowledge (“what is the best option?”) (Motowidlo et al., 2006). In such tests, applicants are presented with work related situations and different courses of action. Individuals must examine the different courses of action, and the likelihood that they will perform that action (Whetzel & McDaniel, 2009). The predictive validity for SJT is .20 and they also have incremental validity when compared to the big five or cognitive ability testing (McDaniel et al., 2007). In terms of reliability, a meta-analysis of 39 studies using different SJTs indicated that there was internal consistency (Cronbach alpha) ranging from .43 to .94 (McDaniel et al., 2001).

Additionally, SJTs tend to offer many advantages over the traditional selection methods such as interviews or personality questionnaires. For instance, unstructured interviews are often put under the radar as they are criticized for lacking a standardized methodology (McDaniel et al., 1994); whereas personality tests have less face validity and tend to be less acceptable to candidates as compared to other selection tools (Steiner & Gilliland, 1996). However, meta-analytical research by Christian et al. (2010) indicates that SJTs have a standardized method of assessing a wide range of non-academic attributes in a variety of applicants because these tests can be based on job relevant situations.

In contrast, traditional selection methods, while established in terms of reliability and validity, are susceptible to biases such as faking and social desirability factors (Morgeson et al., 2007). On the other hand, GBA can be more engaging or motivating for applicants and may also offer advantages in terms of psychological fidelity, construct validity, fake ability, and applicant reactions (Coovert et al., 2020; Georgiou, et al., 2019; Wiernik & Coovert, 2019). In this study, I used a gamified SJT, specifically OWIWI developed by (Georgiou et al., 2019) (See Appendix B).

Game Based Assessments

Even though GBAs are a new phenomenon, there are two kinds of overarching but mutually exclusive game-based assessment categories. One is theory-driven GBA and the other is data-driven GBA (Landers et al., 2021). As the name suggests, a theory driven GBA is an assessment that is designed using traditional psychometric assessment methods to measure behaviors that are relevant to a particular construct. The process is quite elaborate. Developers first begin by identifying the existing theoretical models which exist for the construct. They then develop a game that aims to elicit behaviors like the validated assessment that already exists (Auer et al., 2022). In a theory- driven GBA, the assessment is designed to assess a targeted construct as defined by prior psychological research, producing scores which represent that construct based upon assessed behaviors within the assessment (Landers et al., 2021).

Another GBA that is designed in a completely different way is data driven GBA. This assessment has no specific construct in mind while it is being created. Instead, they are designed to encourage gameplay behaviors that can then be later used to predict behaviors of interest. In this GBA, assessors might look at mouse clicks or certain time spent on tasks or interactions with objects in the game. These behaviors can then be later assessed for a targeted construct (Westera et al., 2014). These two methods of game-based assessments are often scored differently as well. In data driven GBA, existing employees are asked to play the game, and performance metrics from that are developed. That data is then used to generate metrics that are applied to future applicants to predict their performance. Whereas in theory driven GBAs, scoring is done a bit differently. In this, the developers come up with a latent game performance composite score which is then used to represent the construct of interest for that particular GBA. The GBA I used in my study is a theory-driven game-based assessment designed to assess specific competencies (Georgiou et al., 2019).

Game-based assessments involve integrating game elements, which can range from artifacts or social elements, directly into the assessment structure. For instance, just as Likert-type scales rely on multiple choice questions in traditional assessments, game-based assessments offer a unique platform where psychological traits are measured. This is achieved by designing game activities that yield meaningful scores, providing estimates of targeted constructs (Landers et al., 2022).

Furthermore, the concept of gamification involves incorporating game elements into non-gaming contexts such as in hiring or training. This concept has given rise to game-based assessments, which can be categorized based on the extent to which they adopt game characteristics. For example, multimedia SJTs with elements inspired by gamification constitute a distinct category within game-based assessments (Georgiou et al., 2019).

There are many reasons why HR professionals are using gamified assessments these days. Firstly, game-based assessment can promise excitement and fun (Armstrong et al., 2016) as opposed to traditional survey-based assessment, which is considered ordinary and expected (Anderson et al., 2010). Secondly, as suggested by Armstrong et al. (2016); performance on a serious assessment game might be used to assess knowledge, skills, abilities and other characteristics of job candidates. These individual differences can be assessed by psychological tests to predict job performance (Schmidt & Hunter, 1998).

Gamification might lead to better performance prediction by reducing information distortion and providing valuable information about the test takers. This is particularly crucial in high stake situations such as the job application process where test takers may be prone to distorting their responses, either intentionally or unintentionally (Armstrong et al., 2016). For instance, some individuals might exhibit a social desirability bias, inflating their scores to present a more favorable image to the evaluators (Ganster, Hennessey, & Luthans, 1983). However, using a game-based assessment might mitigate this issue. In such an assessment,

participants may find it challenging to respond in socially desirable ways as the context and criteria for desirable behavior are less obvious compared to traditional assessments (Armstrong et al., 2016). Hence by incorporating game elements into the assessments process, gamification creates a more engaging and immersive experience for the test takers. As a result, participants might become more engrossed in the tasks at hand, focusing on challenges presented by the game rather than attempting to strategically present them in a particular way.

Why Should We Use Gamified Assessments for Applicants with ASD?

The use of games has taken a forefront in hiring decisions for many organizations in today's day and age. Human resource professionals are increasingly drawn towards various gaming techniques for candidate selection, including game-based assessments, serious games, and gamified design assessments. Georgiou et al. (2019) suggest that game-based assessment have the potential to reduce test anxiety as individuals might get distracted when they are being assessed since the evaluative aspect might be less salient. However, it is essential to clarify that while they propose this idea, it has not been empirically tested or validated. Hence, this presents a unique opportunity for my study. Unlike previous research, my study aims to examine the impact of anxiety in the context of game-based assessments. Specifically, by conducting rigorous investigation and empirically collecting data, I seek to provide concrete evidence on whether GBAs can indeed mitigate test anxiety for individuals with and without ASD.

GBAs may be particularly beneficial for individuals with ASD for several reasons. Firstly, they often provide a more structured and predictable environment (Fisher et al., 2024), which can help reduce anxiety. Individuals with ASD tend to prefer same and predictable environments, and they have difficulty with transition or changes in routine (American Psychiatric Association, 2000). While GBAs introduce novel elements, they also

provide a structured environment with clear rules and objectives, which might help reduce anxiety compared to the less structured and more socially demanding VCIs, and AVIs.

Also, video games have been shown to have anxiety reducing effects. Research on graduate students using a game-based learning platform revealed that they do not feel like they were being tested, leading to decreased test anxiety (Mavridis & Tsatsos, 2017). Applying this finding to GBA it is possible that individuals with ASD might experience reduced test anxiety when engaged in a gamified assessment, which could positively influence their performance.

Additionally, GBAs can offer a more engaging and immersive experience (Armstrong et al., 2016), which might help distract participants from the evaluative nature of the task. This immersion can help individuals with ASD focus on the task at hand rather than their anxiety. Lastly, GBAs might reduce social pressure and the need for social interaction, which are significant sources of anxiety for individuals with ASD (White et al., 2009) during traditional interviews. By reducing these stressors, GBAs can help individuals with ASD perform closer to their true capabilities.

Based on literature reviewed above, I propose the following hypotheses:

H5: Individuals with ASD will report lower levels of anxiety in GBA than in AVIs and VCI.

H6: Individuals with ASD will demonstrate better performance in GBA than in AVIs and VCI.

Fairness in Selection Methods: AVI and VCI

Along with using technologically advanced selection processes, we also need to ensure that the selection methods are fair to all the candidates. Despite the work world becoming more asynchronous, the traditional selection methods continue to be interviews, whether face-to-face or through asynchronous virtual interviews. Research by Finn et al. (2023) indicated that most participants who are Autistic do not feel comfortable in disclosing their identity in interviews due to the potential bias in the selection process. The literature

also suggests that these traditional selection methods might not be suitable for individuals with ASD. One participant in the study by Finn et al. (2023) also indicated that it would be useful for employers to liaison with Autistic individuals in order to change and implement alternative interview processes. Hence, it would make sense for an inclusive organization to move towards fair and valid methods for all.

One solution for promoting fairness in the selection process, especially for people with ASD could be incorporating video conference interviews or AVIs. While existing research by Basch et al. (2021) has indicated no significant difference in fairness perceptions when comparing face to face interviews with video-based interviews, it is important to consider the unique needs and experiences of people with ASD.

Currently, there is limited research specifically examining the fairness perceptions of individuals with ASD in the context of VCIs or AVIs. However, we can hypothesize that these interview formats may offer certain advantages for individuals with ASD. For instance, Lukacik et al. (2022) suggest that due to higher response preparation time, the opportunity to re-record responses and interrupted interview completion might increase applicants' fairness perceptions in AVIs. The added time to prepare and respond could potentially reduce the pressure and anxiety associated with real time interactions which can be particularly beneficial for individuals with ASD, who may face challenges with spontaneous communication and social interaction (American Psychiatric Association, 2000) to present themselves more effectively and accurately.

Fairness in Selection Methods: Game Based Assessment

The Applicant Reactions Model proposed by Haushnecht et al. (2004) sheds light on how applicant perceptions can significantly impact various outcomes, including actual test performance, self-efficacy, and in terms of employee selection, organizational attractiveness and intentions to accept the job offer. Additionally, when applicants perceive the selection

system as unfair tend to react negatively, leading to increased test anxiety and decreased motivation (Hausknecht et al., 2004).

Incorporating game elements to assessments can potentially enhance application reactions and fairness perceptions. Research by Ferrel et al. (2015) indicates that game elements such as animation, sound effects, instantaneous feedback, varying difficulty, progress bars and narrative contexts have been perceived as face valid by job applicants. This sense of face validity is essential as it might create a more positive perception of the process.

Ellison et al. (2020) has indicated that game-based assessments are considered fair by participants where fairness mediates the relationship between procedural justice rules and willingness to recommend the company to others. Additionally, technology self-efficacy is also significantly related to fairness perceptions for GBAs.

Furthermore, GBAs are inherently more behavioral in nature compared to traditional multiple-choice methods. This characteristic aligns with the concept of procedural justice by Hausknecht et al. (2004) which eludes to the importance of providing individuals with a sense of opportunity to perform. As noted by Landers et al. (2022), GBAs present candidates with challenges that simulate real world scenarios, which offers an opportunity to showcase their abilities and skills practically. Hence, for individuals with ASD who struggle with certain verbal communications or social interactions (American Psychiatric Association, 2000), this behavioral focus might provide a fairer and more comfortable assessment scenario. This was validated in a recent study by Willis et al. (2021) which compared the performance on two GBAs between Autistic individuals and general graduate applicants. The study found that performance on the GBAs was generally similar in both populations.

However, to date there has been a lack of research specifically exploring perceptions of fairness in GBAs for individuals on the spectrum. Whereas existing literature on Autism does highlight the use of games as interventions or treatments for children with Autism

(Herrera et al., 2008). Additionally, game-like smartphone applications have also been explored to support Autistic employees by delivering instructions to them in real time (Burke et al., 2010). This suggests that GBAs hold promise as a suitable medium for selection for individuals with ASD. Not only would this approach make the selection process fairer, but it could also foster an inclusive environment, positioning the organization as an equal opportunity employer.

Procedural Justice: Model of Applicant Reactions

Gilliland's (1993) model of applicant reactions provides a framework to understand how procedural and distributive justice influence applicant perceptions. Procedural justice pertains to the fairness of the processes and methods. Factors such as job relatedness (the perceived relevance of selection methods to the job) and opportunity to perform (the chance to demonstrate skills) are critical in shaping perceptions of fairness (Gilliland, 1993).

For instance, a study by Bies & Shapiro (1988) found that applicant voice in interview was related to the reactions to the interview. AVIs and GBA which align well with this factor might offer a practical way for individuals with ASD to demonstrate their competencies. Additionally, a meta analysis by Hausknecht et al., (2004) found that perceived procedural justice characters such as consistency, job relatedness, face validity, predictive validity, and outcome favorability have moderate relationships with procedural justice, test motivation and attitudes towards selection.

Procedural justice is closely related to overall fairness, influencing both personal outcomes (e.g., self efficacy) and organizational outcomes (e.g., organisational attractiveness). When selection procedures are perceived as highly job related, individuals who are selected tend to experience increased job performance self-efficacy, while those who are not selected may perceive reduced self-efficacy (Gilliland, 1993). Therefore incorporating job relevance into justice perceptions is crucial for determining overall fairness perceptions.

In this study, the focus was on specific justice rules that are relevant to the research context. Drawing from the literature reviewed above, I propose the following hypothesis:

H7: Individuals with ASD will perceive GBAs as fairer as compared to AVIs followed by VCI.

Method

Participants

A total of 53 participants were recruited through a variety of sources in the United States and Canada. Specifically, 6 participants were recruited through BC Autism, 3 from the Fred Smithers Centre at Saint Marys University (SMU) and SONA, and 4 from the accessibility services at Mount Saint Vincent University (MSVU). The remaining participants were recruited through Prolific. Prolific is an online crowdsourcing platform which provides access to participants who are willing to participate in research studies in exchange for compensation (Palan & Schitter, 2018). These collaborative efforts and the use of online platforms ensured an appropriate sample size for the study.

Only participants who passed the attention check questions were included in the final sample. The attention check questions were embedded within various sections of the survey (e.g., MASI, Ease of use, Social Presence Scale) and included items such as “Elephants are smaller than mice” and “The primary colour of the clear daytime sky is green”. Participants were required to correctly answer at least 9 out of 11 attention check questions to be included in the final analysis. This resulted in a final sample of 51 participants, with 25 participants in the ASD group and 26 participants in the non-ASD group.

To determine the required sample size, I conducted a-priori power analysis using G*Power developed by Faul et al (2007). Based on the work of Whelpley & May (2022), I used an alpha level of 0.05, a power level of 0.8 and effect size of 0.3. Using Gpower 3.1, and a 2x3 repeated measures ANOVA, I calculated a required sample size of 20 for each modality. While my goal was to have 20 participants in each of the two groups (individuals

with ASD) and the other comprising of neurotypical individuals (non-ASD), I adopted an oversampling strategy to account for potential sample attrition and the limited number of individuals accessible through SONA

The overall sample had a mean age of $M = 30.7$ years ($SD = 8.65$). Amongst these participants, 20 identified as female (39.2%), 27 identified as male (52.9%) and 4 identified (7.84) as other. The ethnic distribution was predominantly White/Caucasian (49.1%), followed by Asian (20.8%), Black (18.9%), Latino (1.9%), and First Nation (1.9%). The sample was well educated with 58.8% holding either a Bachelors (39.2%) or Masters or Doctoral Degree (19.6%); the remainder had either an Associate or Professional degree (27.4%) or a High School diploma (13.7%). Participants reported an average of 9.74 years ($SD = 8.42$) of work experience and an average of 2.41 years ($SD = 4.04$) of managerial experience.

The mean number of traditional interviews participants had completed in the past was $M = 9.21$ ($SD = 8.93$). For video conference interviews (VCI), the mean was $M = 7.7$ ($SD = 8.84$), asynchronous video interviews (AVI) had a mean of $M = 0.92$ ($SD = 1.68$), and game-based assessments (GBA) had a mean of $M = 0.60$ ($SD = 1.65$).

Participants were compensated either monetarily (CAD\$30), with 10\$ incentive for partaking in each modality (VCI, AVI and GBA) or in the form of course credit. They were awarded 0.5 bonus points for completing each of the AVI and GBA, and 1 bonus point for the VCI (for a total of 2 points) for their chosen courses. If participants did reach the end of the study online and/or did not take the study seriously (e.g., did not take the time to respond carefully to the interview questions), they received partial credits (e.g., 0.25 or 0.50 credits per every 15 minutes spent).

Procedure

Before starting the study, I got approval from the ethics board at Saint Mary's University. Additionally, I also received an approval from the MSVU ethics board to recruit participants from the accessibility service center. After the approval, all participating individuals were given informed consent that their data would be used for research purposes. All participants read a job description for an Assistant store manager position before starting the VCI/AVI/GBA assessments (See Appendix A for detailed description).

At the beginning of the study, participants were sent an online calendar that included different dates and timings regarding their availability for VCI. The study was a repeated measures design where participants in both groups (ASD and Non-ASD) took part in all study conditions. The data collection was done in three phases to prevent fatigue, where each phase took ~30 minutes to complete.

In the first phase both groups (ASD and Non-ASD) took part in video conference interviews (VCIs). Participants were asked five questions designed to assess five competencies including teamwork, integrity, adaptability, resilience and decision making (See Appendix C). During the interviews, I evaluated participants' performance live based on the scoring criteria using behaviorally anchored rating scales (BARS) for each question. To reduce potential bias, the interviews were structured, using standardized questions and rating scales. For participants recruited through Prolific ($N = 40$), data were collected concurrently for ASD and non-ASD individuals, and I was not aware of their group affiliation during the interview. This group represented the large majority of participants. However, for participants recruited from targeted organizations; MSVU ($N = 4$), BC Autism ($N = 6$), and Fred Smithers Centre ($N = 3$), I knew their group affiliation.

Following these interviews, participants were asked to complete several measures to gain insights into their perspectives and experiences. The Selection Procedural Justice Scale

(SPJS) was employed to assess their views on the tests itself, while the Measure of Anxiety in Selection Interviews (MASI) measured their interview anxiety. Additionally, participants also completed the Perceptions of Ease-of-Use Scale to evaluate the ease of using the assessment. Lastly, the Perceived Social Presence Scale was administrated to gauge the degree of social presence in the assessment (see Appendix D, E, F, G).

In the second phase, 1 week after completion, both groups were invited to play the game-based assessment called OWIWI. Afterward, they completed a second SPJS which included questions pertaining to their attitudes towards the game-based assessment. Additionally, they also completed the adopted version of (MASI) to determine their anxiety in GBA, as well as the Perceptions of Ease-of-Use Scale and the Perceived Social Presence Scale. While participants did not directly compare the video conference interview (VCI) and the game-based assessment (GBA) methods, they provided responses to same measures for each assessment, allowing for a comparison in the subsequent analyses.

The third phase occurred one week after the game-based assessments. Both groups were invited to take part in Asynchronous video interviews (AVIs) and complete the SPJS, MASI, Perceptions of Ease-of-Use Scale and the Perceived Social Presence Scale. Participants were directed to an online AVI platform called VIPP (<https://vipp-project.com/>), 2024). In the AVI, applicants were presented with five questions through text on screen, and they were asked to respond through their webcam and microphone. These questions were designed to assess the same five competencies as the VCI and GBA. Participants were instructed to provide detailed responses based on personal experiences or hypothetical situations. They had a maximum of two attempts per question, with ideal responses lasting 2-3 minutes and a maximum of 5 minutes per question. They were also allowed to skip a question if they prefer. The responses are then evaluated at a later time by a research assistant.

Finally, each participant completed a demographics questionnaire once in the first phase of the study (see Appendix H) that asked them to indicate their age, gender, ethnicity, highest level of education, employment status, years of managerial experience, experience with traditional interviews, and experience with AVIs, VCI and GBA. They also completed eleven attention check items that asked them to select ‘agree’ on a ‘strongly disagree’ to ‘strongly agree’ Likert scale. The attention check questions were embedded within various sections of the survey (e.g., MASI, Ease of use, Social Presence Scale) and included items such as “Elephants are smaller than mice” and “The primary colour of the clear daytime sky is green”.

All assessment instruments were initially intended to be presented in randomized order, with counterbalancing done to avoid order effects. The plan was for one group to complete the game-based assessment (OWIWI) first followed by other measures such as AVI and VCI. While the second group would do the reverse. However, for practical reasons with the majority of participants recruited through Prolific, the same order was used for all participants. Therefore, participants completed the assessment in the order of VCI, AVI, and then GBA.

Measures: OWIWI SJT

The Game-based assessment I used in this study is called OWIWI, developed by (Georgiou et al., 2019) (See Appendix B). This is a gamified assessment where the developers have converted an SJT into an adventure story which has game elements and it measures 8 skills including resilience, adaptability, flexibility (willingness to change), decision making, teamwork, learning agility, accountability, and integrity.

Georgiou et al. (2019) followed a three-step process in creating the gamified assessment. They first carried out extensive literature review and tried to identify the core soft skills which organizations seek in young recruits specially amongst the university

graduates. Based on the results, in the first version of their SJT they created a game having four competencies. They believed that it is more suitable to assess these soft skills through gamified assessment as opposed to traditional interviews or psychometric tests. Amongst these, three competencies were used in this study which are defined below:

- 1) **Resilience** can be defined as a developable capacity to rebound or bounce back from adversity, conflict, and failure (Luthans, 2002).
- 2) **Adaptability** is defined as the ability to deal with change in terms of their environment (Hamiaux., 2013).
- 3) **Decision making** can be defined as an intellectual process which requires a response towards the circumstance. Georgiou et al. (2019) say that a competent decision-making process not only involves the ability to understand the information, but also integrate information consistently.

To verify the validity of these competencies, Georgiou et al. (2019) carried out a study which involved validating these SJTs against preexisting measures. The resilience facet of the SJT facet was cross validated against to the Resilience Scale by Wagnild & Young (1993) with a significant correlation ($\beta = 0.350, p < 0.01$). Similarly, the Adaptability SJT facet was validated against the adaptability scale developed by (Martin et al., 2012). The results had with a significant correlation ($\beta = 0.166, p < 0.01$). Lastly, to validate the decision making SJT, the researchers adopted Mincemoyer & Perkins (2003) measure and results demonstrated a meaningful association between the two ($\beta = 0.0389, p < 0.01$).

This first version of gamified SJT has certain design principles which include engagement, feedback progress, freedom of choice and storytelling. The assessment begins when the test takers select an Avatar each of it has a backstory. The story involves heroes in four islands assessing one of the soft skills mentioned above. There are visual and voice overs which narrate the story and increase engagement (Georgiou et al., 2019). In terms of

feedback progress, there is a visual bar showing the progress of the game, and there are rewards given to the test takers when they successfully complete the mission and solve the scenarios. Once the test takers have completed the game, they receive a report on their competencies (Georgiou et al., 2019).

In the second version of the SJT gamification they added four more skills which to the best of my knowledge have not been tested in any other studies. Those included, teamwork, learning agility, integrity, and accountability. For this research, two of the competences from the second version were used which are defined below:

- 4) **Teamwork** can be defined as the extent to which a particular team member is able to meet the overall output goals of that team. It also includes if the individual meets other team members expectations (Ancona & Caldwell, 1992).
- 5) **Integrity** has been defined as the inclination to engage in moral behavior.

The GBA performance scores were initially recorded on a scale of 0 to 100 for each competency. To standardize the scoring system and facilitate comparisons with other measures, these scores were rescaled to a 1 to 5 scale. The rescaling was performed using the following formula: $\text{Rescaled GBA score} = \left(\frac{\text{Original GBA score}}{25} \right) + 1$.

This transformation ensures that the minimum possible score of 0 corresponds to 1 on the rescaled scale, and the maximum possible score of 100 corresponds to 5 on the rescaled scale. This rescaling allows for a consistent range across difference performance measures used in this study.

Interview Performance

To measure the same skills in structured interviews as OWIWI, I adopted and created a set of 10 questions (five for AVI, five for VCI) measuring each skill. The interview questions were adapted from previous papers (Roulin et al. 2023; Roulin, 2022; Salimian Rizi & Roulin, 2023). A 5-point behaviorally anchored rating scale (i.e., BARS—ranging from 1

= poor performance to 5 excellent performance) was developed for the evaluation of responses to each question and assessing whether the interviewee demonstrated the relevant skill. BARS are an important part of interview structure (Levashina, Hartwell, Morgeson, & Campion, 2014) and should contribute to reducing biases.

The interview performance was rated independently and overall internal consistency of $\alpha = 0.94$ for VCI and $\alpha = 0.75$ for AVI (For detailed items, refer to Appendix C). To ensure consistency and accuracy in the evaluation process, we recruited a research assistant (RA) who was trained through two meetings. In the first meeting, I explained the interview questions and the BARS created for AVI, and we practiced evaluating a few participants together. In the second meeting, the RA and I independently scored the fifteen questions from three participants and then compared our ratings. For the 12 of the 15 ratings, we achieved perfect agreement, and for the 3 ratings, there was only one-point difference. Given this high level of agreement, the RA was deemed ready to rate the remaining interviews independently. Regular check-ins were conducted with the RA after every 15 participants to ensure ongoing consistency and accuracy in the evaluations.

The mean response to the interview seriousness item across the two assessment types "I completed the video interview as seriously as I would if I was applying for a real job" was $M = 4.49$ ($SD = 0.78$). The item relied on a 1 (Strongly Disagree) to 5 (Strongly Agree) Likert scale, suggesting that most participants took the interview seriously.

Measure of Anxiety in Selection Interviews (MASI)

To measure interview anxiety, it is essential to differentiate between trait anxiety (general test/ assessment anxiety) with state anxiety (anxiety experienced during a specific interview such as AVI or VCI (Powell et al., 2018). These two constructs are conceptually different but highly related (McCarthy & Goffin, 2004).

To measure state anxiety, I used an adapted 18 item version of the MASI Scale developed by McCarthy & Goffin (2004), (see Appendix D). The scale employs a Likert type format with responses ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) and it goes above and beyond by measuring five interview anxiety dimensions namely communication, appearance, social, performance and behavioral. Eighteen items from three of the five factors were used for this study: a) Communication (e.g., "I became so apprehensive in the interview that I was unable to express my thoughts clearly."). Communication anxiety gauge's feelings of nervousness or apprehension regarding one's verbal communication and nonverbal communication skills during job interviews. Effective communication plays a crucial role during interviews since there is constant interaction between the interviewer and interviewee.

b) Social (e.g., "While in the interview, I became concerned that the interviewer would perceive me as socially awkward."). Social anxiety assesses nervousness about one's own social behaviors including aspects like handshakes and personal impressions during the interview. This type of anxiety is likely to play a vital role in job interviews since they require social interaction. c) Performance (e.g., "In the interview, I got very nervous about whether my performance was good enough."). Performance anxiety reflects concerns about the outcome of a test often manifested as fear of failure (McCarthy & Goffin, 2004). Since both interviews and GBAs are high stake situations, performance anxiety might significantly play a role in their overall performance. This version of the MASI was applied not only in the context of interviews (VCI and AVI) but also adapted for use with GBAs to ensure a comprehensive assessment of anxiety across different assessment methods. The adaptation included items specifically designed for the GBA context, such as: "I became so apprehensive during the game-based assessment that I had difficulty conveying my thoughts effectively" and "I found it easy to showcase my qualities or skills during the game-based assessment."

This adaptation allowed for consistent measurement of anxiety dimensions regardless of the assessment type, thereby providing a robust basis for comparison across different formats.

In this study, the overall internal consistency of the MASI scale was $\alpha = 0.94$ for VCI, $\alpha = 0.95$ for AVI and $\alpha = 0.95$ for GBA, consistent with the internal consistency reported by McCarthy & Goffin (2004).

Perceived Ease of Use Scale

I combined the six items ($\alpha=0.83$) from Basch & Melchers (2021) measures of perceived ease of use and usefulness. Items were slightly reworded to capture participants experience instead of expectations (e.g., “My interaction with the video interview program was clear and understandable” vs. “My interaction with a program for video interviews would be clear and understandable”). A similar measure was used for GBA as well, where I replaced “interview” by “gamified assessment” (e.g., “I found it easy to complete the gamified assessment” vs “Completing a video interview would be easy for me”). Responses were on a 1-5 scale (strongly disagree-strongly agree) (For detailed items see Appendix E). The overall internal consistency of the perceived ease of use scale was $\alpha = 0.87$ for VCI, $\alpha = 0.80$ for AVI, and $\alpha = 0.85$ for GBA.

Perceived Social Presence Scale

To measure perceived social presence, I used a 5-item scale ($\alpha=.92$) adapted from Gefen and Straub (1997). Example item includes (“There was a sense of human contact in this interview”). Similar measure will be used for GBA as well, where I replaced “interview” by “gamified assessment” (e.g., “There was a sense of personalness in this gamified assessment”). Participants responded on a 5-point Likert scale (1= strongly disagree to 5= strongly agree - For detailed items see Appendix F). The overall internal consistency of the

perceived social presence scale was $\alpha = 0.88$ for VCI, $\alpha = 0.98$ for AVI, and $\alpha = 0.93$ for GBA.

Selection Procedural Justice Scale (SPJS)

The Selection Procedural Justice Scale (SPJS), developed by Bauer et al. (2001) assesses dimensions of process and outcome fairness in accordance with the model proposed by Gilliland (1993). Within this scale, there exist 11 dimensions of fairness, which are subsumed two higher order factors: structure fairness and social fairness.

The structure fairness subscale encompasses five justice rules assessing formal characteristics of the selection process (e.g.; job relatedness, reconsideration opportunity, chance to perform). In parallel, the social fairness subscale also comprises of five justice rules regarding explanation, justification, and feedback about a selection decision, and the interpersonal treatment of the applicants (e.g., openness, two-way communication). Additionally, the scale also incorporates another factor regarding job relatedness of the test. Respondents provide ratings for these items on a five-point Likert scale, ranging from 1 (Strongly disagree) to 5 (Strongly agree). (For detailed items, refer to Appendix G)

In this study, the focus was on specific justice rules that are particularly relevant to my research context. From the structure fairness subscale, I used only two factors: a) Job-related predictive (“Doing well on this test means a person can do the job well”). This factor allows participants to convey their perception of fairness in the test, indicating its alignment with requirements of the job. b) Chance to perform (“I could really show my skills and abilities through this test”). This factor provides insight into participants ability to showcase their skills during the test, thereby reflecting their perception of fairness.

Conversely, from the social fairness subscale, the one factor was used; Propriety of Questions (“The content of the test seemed appropriate”). This factor indicates whether participants perceived the test content as unbiased and suitable for assessment. The overall

internal consistency of the Selection Procedural Justice Scale (SPJS) was $\alpha = 0.74$ for VCI, $\alpha = 0.76$ for AVI, and $\alpha = 0.83$ for GBA.

Results

Data was analyzed using R studio. Descriptive statistics (means and standard deviations) for demographic data as well as performance on the self-report questionnaires and game-based assessment were calculated for the overall sample (See Table 1) and ASD (See Table 2) and non-ASD sample (See Table 3). Several notable patterns and differences emerged between the ASD and non-ASD populations. Both groups exhibit a strong negative correlation between anxiety and ease of use for VCI and GBA, suggesting that higher anxiety is associated with lower perceptions of ease of use in these contexts. However, for AVI, this relationship is markedly stronger in the non-ASD group, indicating that anxiety significantly impacts ease of use for AVI in this population.

Ease of use consistently correlates positively with perceived social presence and procedural justice across all assessment types for both populations. This suggests that individuals, regardless of ASD status, tend to perceive assessment methods as fairer and feel a higher social presence when they find methods easier to use. Interestingly, while the relationship between anxiety and perceived social presence for VCI is weak for both groups, ease of use and procedural justice are strongly correlated, emphasizing the importance of justice and ease of use for in perceptions of fairness.

Anxiety

A 2x3 mixed ANOVA was conducted to examine the effects of assessment type (VCI, AVI, GBA) and participant group (ASD, non-ASD) on anxiety scores. This was used to test H1 (*Individuals with ASD will report higher levels of anxiety in VCI compared to those without ASD*), H3 (*Individuals with ASD will report lower levels of anxiety in AVIs than in VCIs*), and H5 (*Individuals with ASD will report lower levels of anxiety in GBA than in AVIs and VCIs*).

Prior to conducting the ANOVA, the assumption of normality was assessed using the Shapiro-Wilk test and examining skewness and kurtosis. Results indicated that anxiety scores for VCI, AVI, and GBA were normally distributed for VCI ($W = 0.983, p = .671$; Skewness = 0.098, Kurtosis = -0.741), AVI ($W = 0.980, p = .541$; Skewness = -0.007, Kurtosis = -0.750), and GBA ($W = 0.971, p = .236$; Skewness = 0.209, Kurtosis = -0.906). Additionally, univariate outliers were checked using the interquartile range (IQR) method, and no univariate outliers were detected. Furthermore, multivariate outliers were checked using the Mahalanobis distance, and no multivariate outliers were identified.

Additionally, Levene's test was used to check the homogeneity of variance. The results indicated that the assumption of homogeneity was violated for VCI anxiety scores ($F(1, 49) = 4.153, p = .047$) but was met for AVI ($F(1, 49) = 1.933, p = .171$) and GBA anxiety scores ($F(1, 49) = 0.287, p = .594$). Mauchly's test for sphericity was conducted and indicated that the assumption of sphericity was met (Assessment Type: $W = 0.910, p = .104$; Assessment Type * Group: $W = 0.910, p = .104$).

The ANOVA results showed that the main effect of assessment type on anxiety scores was not statistically significant, $F(2, 98) = 1.94, p = .15, \eta^2 = .017$. There was also no significant interaction between assessment type and participant group, $F(2, 98) = 0.65, p = .53, \eta^2 = .006$. The main effect of participant group was also not significant, $F(1, 49) = 0.41, p = .53, \eta^2 = .005$.

Descriptive statistics indicated that for the ASD group, the mean anxiety scores were $M = 2.99 (SD = 0.70)$ for VCI, $M = 2.95 (SD = 0.87)$ for AVI, and $M = 2.58 (SD = 0.91)$ for GBA. For the non-ASD group, the mean anxiety scores were $M = 2.70 (SD = 1.05)$ for VCI, $M = 2.80 (SD = 1.07)$ for AVI, and $M = 2.63 (SD = 1.02)$ for GBA (see Figure 1).

Post-hoc tests using Tukey's HSD revealed no significant differences in anxiety scores for the ASD group between VCI and AVI ($p = .97$), AVI and GBA ($p = .21$), and VCI

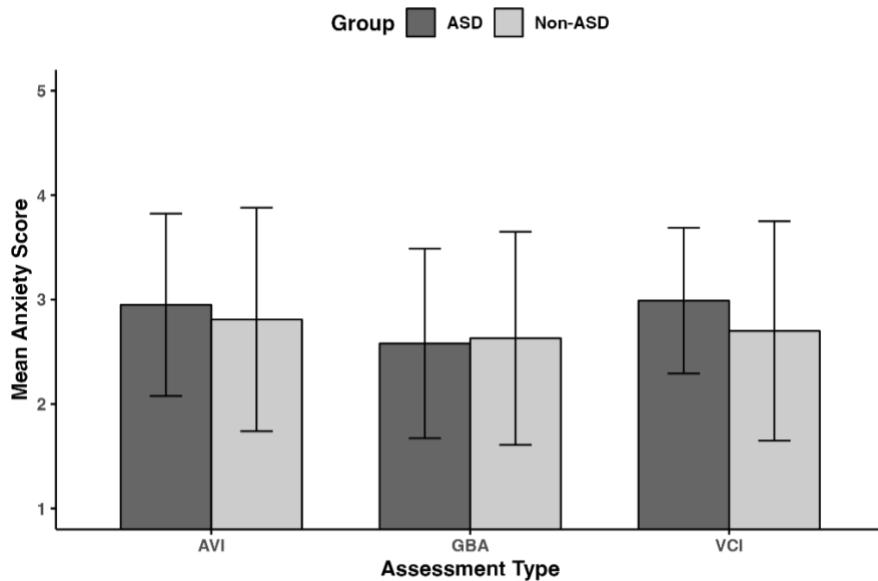
and GBA ($p = .14$). For the non-ASD group, no significant differences were found between VCI and AVI ($p = .87$), VCI and GBA ($p = .94$) and AVI and GBA ($p = .69$).

A Welch's t-test was also conducted to compare VCI anxiety scores specifically between the ASD and non-ASD groups, given the violation of the homogeneity of variance assumption for VCI anxiety. The Welch's t-test did not reveal a significant difference in VCI anxiety scores between the ASD ($M = 2.99$, $SD = 0.75$) and non-ASD ($M = 2.70$, $SD = 0.69$) groups, $t(43.552) = 1.177$, $p = .245$, with a 95% confidence interval for the mean difference ranging from -0.21 to 0.80.

Additionally, the effect sizes were calculated using Cohen's d to provide a measure of the practical significance of the results. For H1, the comparison of anxiety levels between ASD and Non-ASD participants in the VCI condition, *Cohen's d* = 0.33, indicating a small to medium effect size. For H3, comparing anxiety levels between VCI and AVI within the ASD group, *Cohen's d* = 0.06, indicating a very small effect size. For H5, comparing anxiety levels between AVI and GBA within the ASD group, *Cohen's d* = 0.42, indicating a medium effect size, and comparing anxiety levels between VCI and GBA within the ASD group, *Cohen's d* = 0.51, also indicating a medium effect size.

In summary, the results did not support the hypothesis that individuals with ASD will exhibit higher levels of anxiety in the VCI condition compared to those without ASD (H1). Similarly, the results did not support the hypotheses that individuals with ASD exhibit significantly lower levels of anxiety in AVIs compared to VCIs (H3), or in GBA compared to AVIs and VCIs (H5). The anxiety levels are comparable across different assessment types and participant groups, with effect sizes indicating small to medium differences.

Figure 1

Mean Anxiety scores by assessment type and participant group

Note: $N = 51$ participants. $N = 25$ for ASD group, $N = 26$ for non-ASD groups

Table 1
Means, standard deviations, and correlations for Overall sample

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
15. Performance GBA	3.55	0.33	-0.05	-0.05	-0.18	-0.39**	-0.20	-0.24	-0.15	-0.16	-0.10	-0.21	-0.06	-0.02	0.12	-0.02							
16. Age	30.68	8.65	-0.18	-0.17	0.07	0.05	0.05	-0.13	0.21	-0.08	-0.08	0.21	0.09	0.10	0.32	0.14	0.13						
17. Work Exp	9.75	8.43	-0.16	-0.18	0.17	-0.07	-0.06	-0.22	0.16	-0.25	-0.27	0.15	0.01	-0.05	0.45	0.11	0.17	0.86					
18. FTF Exp	9.22	8.94	-0.27	-0.30	0.18	0.04	0.16	-0.40	0.10	-0.10	-0.18	0.15	0.24	-0.13	0.40	0.05	0.26	0.46	0.52				
19. VCI Exp	7.78	8.84	0.05	-0.07	0.03	-0.09	-0.08	0.01	0.13	0.03	0.01	0.07	-0.05	-0.01	0.22	0.13	-0.04	0.13	0.14	0.19			
20. AVI Exp	0.92	1.68	-0.15	-0.26	0.07	0.09	0.26	-0.20	0.18	0.41	0.18	0.27	0.21	-0.03	-0.24	-0.21	-0.29	-0.06	0.02	0.10	0.21		
21. GBA Exp	0.61	1.65	0.12	-0.08	-0.13	-0.16	0.06	0.03	-0.15	0.16	0.08	-0.02	0.13	0.03	-0.06	-0.12	-0.07	0.05	0.05	-0.01	0.13	0.36	

Note. M and SD are used to represent mean and standard deviation, respectively. * Indicates $p < .05$. ** indicates $p < .01$. Presence VCI = Perceived social presence in the VCI, Anxiety VCI = MASI scores in VCI, Ease VCI = Ease of use in the VCI, Procedural Justice VCI = Procedural Justice scores in VCI, Work Exp: Years of work experience, FTF Exp = Face to face video interviews completed in the past, VCI Exp = video conference interviews completed in the past, GBA Exp = game-based assessments completed in the past. This table used the apaTables package in R (Stanley, 2022)

Table 2
Means, standard deviations, and correlations for ASD sample

9.Presence GBA	3.07	1.06	-0.22	-0.01	0.21	0.34	0.39	0.13	0.48	0.70												
10.Justice VCI	3.63	0.62	-0.52	-0.13	0.32	0.77*	0.38	0.25	0.68	0.43	0.37											
11.Justice AVI	3.44	0.61	-0.19	-0.18	0.30	0.37	0.43	0.14	0.30	0.55	0.25	0.68*										
12.Justice GBA	3.60	0.70	-0.20	0.15	-0.03	0.46	0.33	0.62*	0.43	0.16	0.55	0.52	0.45									
13.Performance VCI	2.70	1.14	0.02	-0.10	-0.30	-0.27	-0.16	0.12	-0.53*	-0.60	-0.54	-0.24	-0.27	-0.17								
14.Performance AVI	3.24	0.91	0.26	0.14	-0.40	-0.05	-0.38	0.08	-0.12	-0.44*	-0.37	-0.41	-0.27	-0.18	0.28							
15.Performance GBA	3.54	0.31	0.13	0.08	-0.25	-0.44	-0.33	-0.16	-0.26	-0.25	-0.25	-0.39	-0.23	-0.11	0.17	0.15						
16.Age	29.04	5.79	-0.12	-0.12	-0.18	0.34	0.14	0.29	0.27	0.04	0.05	0.30	0.14	0.41	-0.00	0.24	-0.05					
17.Work Exp	6.76	5.15	-0.25	-0.34	-0.03	0.23	-0.01	0.04	0.11	-0.08	-0.11	0.15	-0.07	0.10	0.12	0.16	-0.14	0.67				
18.FTF Exp	5.92	5.98	-0.23	-0.32	0.02	0.17	0.31	-0.07	-0.04	-0.10	-0.22	0.17	0.24	0.19	0.28	0.03	-0.01	0.51	0.56			
19.VCI Exp	8.52	10.76	-0.09	-0.17	-0.18	-0.04	-0.07	0.08	0.03	-0.04	0.03	0.13	-0.15	-0.04	0.38	0.06	-0.03	0.30	0.23	0.26		
20.AVI Exp	0.96	2.19	-0.17	-0.45	0.09	0.07	0.36	-0.38	0.06	0.44	0.22	0.26	0.22	-0.19	-0.30	-0.34	-0.35	-0.16	0.05	0.17	0.15	
21.GBA Exp	0.68	1.99	0.29	-0.24	-0.12	-0.37	0.13	-0.21	-0.35	0.28	0.20	-0.21	0.20	-0.24	-0.01	0.13	-0.14	-0.16	-0.20	0.02	0.22	0.43

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. * Indicates $p < .05$. ** indicates $p < .01$. Presence VCI = Perceived social presence in the VCI, Anxiety VCI = MASI scores in VCI, Ease VCI = Ease of use in the VCI, Procedural Justice VCI = Procedural Justice scores in VCI, Work Exp: Years of work experience, FTF Exp = Face to face video interviews completed in the past, VCI Exp = video conference interviews completed in the past, GBA Exp = game-based assessments completed in the past. This table used the apaTables package in R (Stanley, 2022)

Table 3
Means, standard deviations, and correlations for non-ASD sample

11.Justice AVI	3.31	0.66	-0.33	-0.78*	-0.21	0.21	0.76*	0.13	0.26	0.39	0.31	0.54*										
12.Justice GBA	3.03	0.69	-0.15	-0.26	-0.52	-0.13	0.39	0.63*	0.27	0.35	0.42	0.25	0.47*									
13.Performance VCI	3.82	0.82	-0.24	-0.32	0.09	0.04	0.08	-0.10	0.19	-0.25	-0.23	0.12	0.05	-0.16								
14.Performance AVI	3.42	0.73	0.15	0.14	0.14	-0.11	-0.15	0.01	0.08	0.09	-0.01	-0.33	-0.18	-0.17	0.29							
15.Performance GBA	3.55	0.36	-0.15	-0.14	-0.13	-0.35	-0.08	-0.30	-0.04	-0.07	0.02	-0.05	0.07	0.07	0.07	-0.20						
16.Age	32.19	10.53	-0.17	-0.18	0.18	-0.07	-0.00	-0.26	0.17	-0.03	-0.05	0.22	0.10	0.08	0.50	0.06	0.21					
17.Work EXP	12.62	9.96	-0.06	-0.10	0.27	-0.21	-0.09	-0.24	0.16	-0.15	-0.19	0.25	0.11	0.11	0.57	0.04	0.32	0.91				
18.FTF Exp	12.38	10.20	-0.23	-0.28	0.26	-0.02	0.09	-0.49	0.14	0.24	0.02	0.25	0.34	-0.09	0.31	-0.00	0.42	0.41	0.43			
19.VCI Exp	7.08	6.64	0.17	0.03	0.34	-0.16	-0.08	-0.11	0.34	0.08	-0.08	-0.05	0.06	-0.05	0.11	0.28	-0.05	0.07	0.20	0.28		
20. AVI Exp	0.88	1.03	-0.21	-0.03	0.06	0.16	0.07	0.01	0.51	0.47	0.15	0.33	0.24	0.26	-0.16	0.09	-0.26	0.03	0.01	0.12	0.44	
21.GBA Exp	0.54	1.27	-0.04	0.10	-0.14	0.09	-0.05	0.31	0.21	-0.11	-0.11	0.26	0.03	0.40	-0.11	-0.58	0.03	0.25	0.30	-0.01	-0.12	0.14

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. * Indicates $p < .05$. ** indicates $p < .01$. Presence VCI = Perceived social presence in the VCI, Anxiety VCI = MASI scores in VCI, Ease VCI = Ease of use in the VCI, Procedural Justice VCI = Procedural Justice scores in VCI, Work Exp: Years of work experience, FTF Exp = Face to face video interviews completed in the past, VCI Exp = video conference interviews completed in the past, GBA Exp = game-based assessments completed in the past. This table used the apaTables package in R (Stanley, 2022)

Performance

A 2x3 mixed ANOVA was conducted to examine the effects of assessment type (VCI, AVI, GBA) and participant group (ASD, non-ASD) on performance scores. This was used to test H2 (*Individuals with ASD will demonstrate lower performance in VCI compared to those without ASD*), H4 (*Individuals with ASD will demonstrate better performance in AVIs than in VCIs*), and H6 (*Individuals with ASD will demonstrate better performance in GBA than in AVIs and VCIs*).

Prior to conducting the ANOVA, the assumption of normality was assessed using the Shapiro-Wilk test and examining skewness and kurtosis. Results indicated that performance scores were not normally distributed for VCI ($W = 0.914, p = .0015$; Skewness = -0.447, Kurtosis = -1.112) and AVI ($W = 0.932, p = .0063$; Skewness = -0.485, Kurtosis = -0.849) but normally distributed for GBA ($W = 0.984, p = .724$; Skewness = -0.253, Kurtosis = -0.325). Additionally, univariate outliers were checked using the interquartile range (IQR) method, and no univariate outliers were detected. Additionally, multivariate outliers were checked using the Mahalanobis distance, and no multivariate outliers were identified.

Additionally, Levene's test was used to check the homogeneity of variance. The results indicated that the assumption of homogeneity was violated for VCI performance scores ($F(1, 48) = 5.484, p = .023$) but was met for AVI ($F(1, 48) = 1.412, p = .241$) and GBA performance scores ($F(1, 48) = 0.482, p = .491$).

The Mauchly's sphericity test was conducted to check for the sphericity assumption, which was not violated for assessment type ($W = 0.946, p = .274$) or for the interaction between assessment type and participant group ($W = 0.946, p = .274$), indicating that the variance of the differences between all combinations of conditions were equal.

The mixed ANOVA results indicated a statistically significant main effect of assessment type on performance scores, $F(2, 96) = 10.104, p < .001, \eta^2 = .11$. There was also a significant interaction between assessment type and participant group, $F(2, 96) = 8.752, p < .001, \eta^2 = .09$. The main effect of participant group was significant as well, $F(1, 48) = 8.902, p = .004, \eta^2 = .07$.

Descriptive statistics indicated that for the ASD group, the mean performance scores were $M = 2.70 (SD = 1.14)$ for VCI, $M = 3.24 (SD = 0.91)$ for AVI, and $M = 3.54 (SD = 0.30)$ for GBA. For the non-ASD group, the mean performance scores were $M = 3.82 (SD = 0.83)$ for VCI, $M = 3.40 (SD = 0.74)$ for AVI, and $M = 3.55 (SD = 0.36)$ for GBA (See Figure 2).

To further investigate the differences, post-hoc comparisons were conducted using Tukey's HSD. The results indicated that within the ASD group, performance scores were significantly higher in AVI compared to VCI (estimate = -0.534, $SE = 0.202, p = .025$) and significantly higher in GBA compared to VCI (estimate = -0.836, $SE = 0.202, p = <.001$). No significant difference was found between AVI and GBA performance scores (estimate = -0.302, $SE = 0.202, p = .295$). For the non-ASD group, no significant differences were found between any of the assessment types.

Additionally, Welch's t-test was conducted to compare VCI performance scores specifically between the ASD and non-ASD groups, given the violation of the homogeneity of variance assumption for VCI performance. The Welch's t-test revealed a significant difference in VCI performance scores between the ASD ($M = 2.70, SD = 1.14$) and non-ASD ($M = 3.82, SD = 0.83$) groups, $t(43.923) = -3.938, p = .0003$, with a 95% confidence interval for the mean difference ranging from -1.68 to -0.54.

Effect sizes were calculated using Cohen's d to provide a measure of the practical significance of the results. For H2, the comparison of performance levels between ASD and

Non-ASD participants in the VCI condition, *Cohen's d* = -1.11, indicating a large effect size.

For H4, comparing performance levels between VCI and AVI within the ASD group,

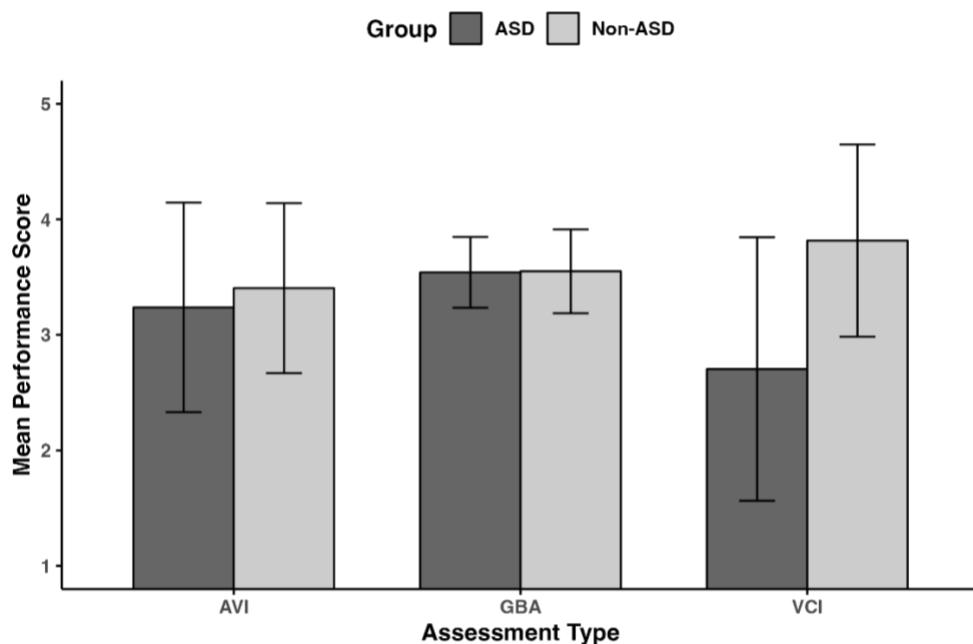
Cohen's d = -0.52, indicating a medium effect size. For H6, comparing performance levels between AVI and GBA within the ASD group, *Cohen's d* = -0.45, indicating a medium effect size, and comparing performance levels between VCI and GBA within the ASD group,

Cohen's d = -1.0, indicating a large effect size.

In conclusion, the results support Hypothesis 2, indicating that individuals with ASD demonstrated significantly lower performance in the VCI assessment compared to those without ASD. Hypothesis 4 is also supported, as individuals with ASD demonstrated better performance in AVIs compared to VCIs. However, Hypothesis 6 is only partially supported, as individuals with ASD demonstrated better performance in GBAs compared to VCIs but not in GBA compared to AVI.

Figure 2

Mean Performance scores by assessment type and participant group



Note: N = 51 participants. N = 25 for ASD group, N = 26 for non-ASD group.

Fairness

Selection Procedural Justice Scale (SPJS)

A 2x3 mixed ANOVA was conducted to examine the effects of assessment type (VCI, AVI, GBA) and participant group (ASD, non-ASD) on procedural justice. This was used to test H7 (*Individuals with ASD will perceive GBAs as fairer as compared to AVIs followed by VCI*). Prior to conducting the ANOVA, I confirmed that the assumption of normality was satisfied as the distributions were associated with skew and kurtosis values less than |2.0| and |9.0|. Additionally, Levene's test was used to check the homogeneity of variance. The results indicated that the assumption of homogeneity was met ($F(5, 147) = 0.284, p = .921$).

Mauchly's test for sphericity indicated that the assumption of sphericity was not violated for either the main effect of assessment type ($W = 0.903, p = .087$) or the interaction between assessment type and participant group ($W = 0.903, p = .087$).

The ANOVA results indicated a significant main effect of assessment type on procedural justice scores, $F(2, 98) = 3.781, p = .026, \eta^2 = .026$. There was also a significant interaction between assessment type and participant group, $F(2, 98) = 3.65, p = .030, \eta^2 = .025$. However, the main effect of participant group was not significant, $F(1, 49) = 3.67, p = .061, \eta^2 = .047$.

Descriptive statistics indicated that for the ASD group, the mean procedural justice scores were $M = 3.63 (SD = 0.62)$ for VCI, $M = 3.44 (SD = 0.61)$ for AVI, and $M = 3.60 (SD = 0.70)$ for GBA. For the non-ASD group, the mean procedural justice scores were $M = 3.49 (SD = 0.60)$ for VCI, $M = 3.31 (SD = 0.66)$ for AVI, and $M = 3.03 (SD = 0.69)$ for GBA. (See Figure 3).

Post-hoc tests using Tukey's HSD revealed no significant differences in procedural justice scores for the ASD group between VCI and AVI ($p = .315$), VCI and GBA ($p = .966$), and AVI and GBA ($p = .452$). However, for the non-ASD group, significant differences were

found between VCI and GBA ($p = .002$), with higher fairness scores for VCI. There were no significant differences between VCI and AVI ($p = .379$) or AVI and GBA ($p = .079$).

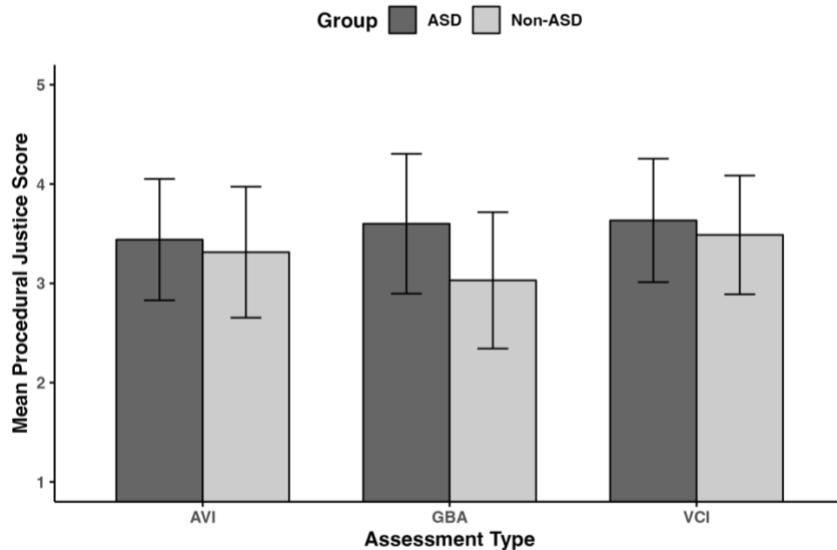
Effect sizes were calculated using Cohen's d to provide a measure of the practical significance of the results. For VCI, *Cohen's d* = 0.24, and for AVI, *Cohen's d* = 0.29, indicating a small effect size, whereas for GBA, *Cohen's d* = 0.82, indicating a large effect size.

The results do not support H7. Individuals with ASD did not show significant preference for GBAs over AVIs and VCIs in terms of perceived fairness. However, it is notable that individuals with ASD perceived GBAs to be much fairer than individuals without ASD. In contrast, individuals without ASD perceived VCI as significantly fairer in terms of procedural justice than GBA, with a trend suggesting that AVIs were also perceived fairer than GBAs.

These findings indicate that while there are differences in perceived fairness between assessment types, the hypothesized pattern of GBAs being perceived as fairer by individuals with ASD was not observed. Nonetheless, the higher fairness ratings for GBA by individuals with ASD compared to non-ASD participants suggest that GBA might still hold potential benefits for this group.

Figure 3

Mean Procedural Justice scores by assessment type and participant group



Note: $N = 51$ participants. $N = 25$ for ASD group, $N = 26$ for non-ASD group.

Additional Exploratory Analysis

An exploratory analysis was conducted to gain a deeper understanding of user experience and performance within different assessment contexts. This analysis focused on three key aspects: Ease of Use, Perceived Social Presence, and the relationship between Anxiety and Performance.

Ease of use

A 2x3 mixed ANOVA was conducted to examine the effects of assessment type (VCI, AVI, GBA) and participant group (ASD, non-ASD) on Ease of Use. Prior to conducting the ANOVA, I confirmed that the assumption of normality was satisfied as the distributions were associated with skew and kurtosis values less than |2.0| and |9.0|.

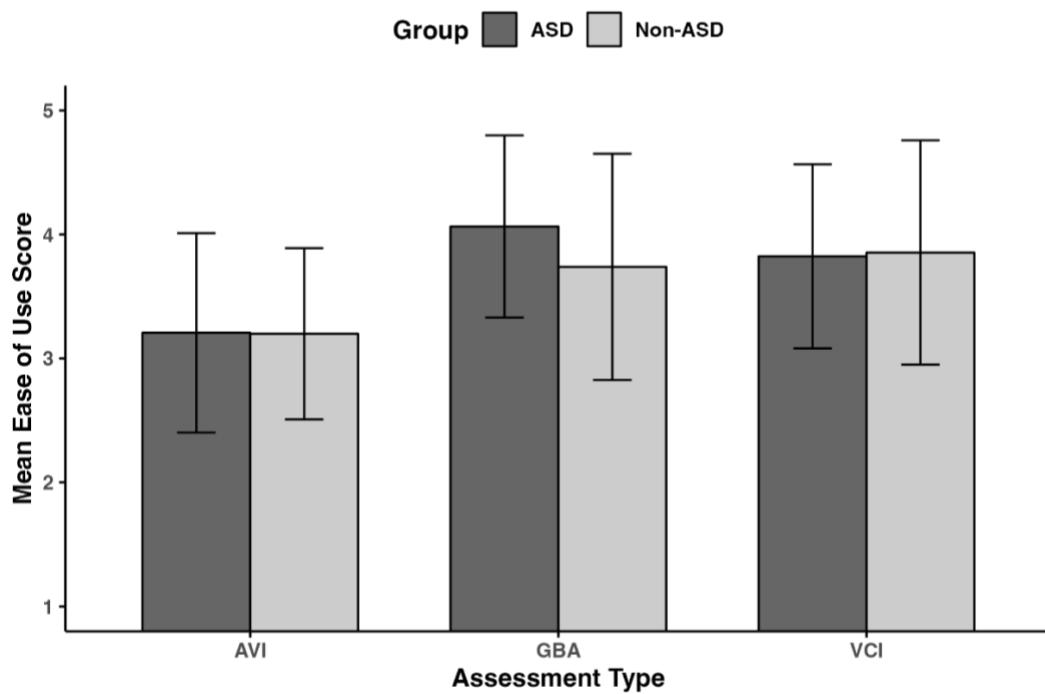
The ANOVA results showed a significant main effect of assessment type on ease of use, $F(2,98) = 3.31, p = .041, \eta^2 = .035$. However, there was no significant interaction between assessment type and participant group, $F(2,98) = 0.92, p = .401, \eta^2 = .010$. The main effect of participant group was also not significant, $F(1,49) = 0.44, p = .508, \eta^2 = .004$.

Descriptive statistics indicated that for the ASD group, the mean Ease of Use scores were $M = 3.82$ ($SD = 0.74$) for VCI, $M = 3.21$ ($SD = 0.80$) for AVI, and $M = 4.06$ ($SD = 0.73$) for GBA. For the non-ASD group, the mean Ease of Use scores were $M = 3.85$ ($SD = 0.90$) for VCI, $M = 3.20$ ($SD = 0.69$) for AVI, and $M = 3.74$ ($SD = 0.91$) for GBA. (See Figure 4).

Post-hoc tests using Tukey's HSD revealed significant differences in Ease-of-Use scores for the ASD group between VCI and AVI ($p = .009$), AVI and GBA ($p = <.001$, but not between VCI and GBA ($p = .474$). For the non-ASD group, significant differences were found between VCI and AVI ($p = .004$) and AVI and GBA ($p = .023$), but not between VCI and GBA ($p = .835$).

Figure 4

Mean Ease of use scores by assessment type and participant group



Note: $N = 51$ participants. $N = 25$ for ASD group, $N = 26$ for non-ASD group.

Perceived Social Presence Scale

A 2x3 mixed ANOVA was conducted to examine the effects of assessment type (VCI, AVI, GBA) and participant group (ASD, non-ASD) on perceived social presence. Prior to conducting the ANOVA, I confirmed that the assumption of normality was satisfied as the distributions were associated with skew and kurtosis values less than |2.0| and |9.0|.

The ANOVA results showed that the main effect of assessment type on perceived social presence was not statistically significant, $F(2,98) = 0.27, p = .761, \eta^2 = .002$. However, there was a significant interaction between assessment type and participant group, $F(2,98) = 10.32, p < .001, \eta^2 = .068$. The main effect of participant group was also significant, $F(1,49) = 6.48, p = .014, \eta^2 = .080$.

Descriptive statistics indicated that for the ASD group, the mean perceived social presence scores were $M = 3.72 (SD = 0.85)$ for VCI, $M = 2.73 (SD = 1.33)$ for AVI, and $M = 3.07 (SD = 1.06)$ for GBA. For the non-ASD group, the mean perceived social presence scores were $M = 3.88 (SD = 0.74)$ for VCI, $M = 1.63 (SD = 0.87)$ for AVI, and $M = 2.26 (SD = 1.12)$ for GBA. (See Figure 5).

Post-hoc tests using Tukey's HSD revealed significant differences in perceived social presence scores for the ASD group between VCI and AVI ($p < .001$), VCI and GBA ($p = .006$). No significant difference was found between AVI and GBA ($p = .224$). For the non-ASD group, significant differences were found between VCI and AVI ($p < .001$), VCI and GBA ($p < .001$) and AVI and GBA ($p = .007$) with higher perceived social presence scores for VCI.

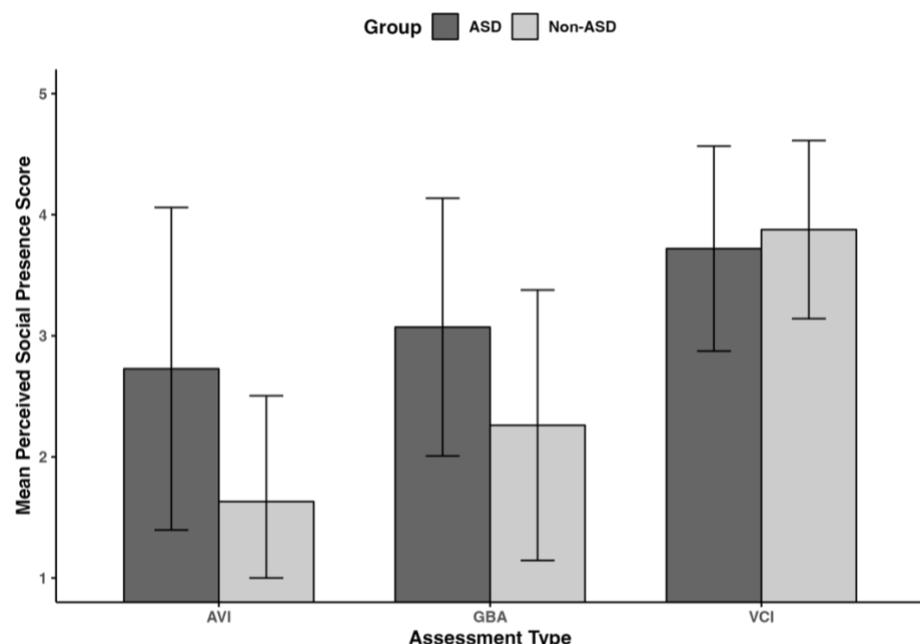
To further explore the interaction effect, post-hoc tests comparing perceived social presence scores between ASD and non-ASD participants for each assessment type were

conducted. These analyses revealed that for VCI scores, there was no significant difference between the ASD and non-ASD groups (estimate = -0.157, $SE = 0.284$, $p = .581$). However, for AVI scores, ASD participants had significantly higher perceived social presence scores compared to non-ASD participants (estimate = 1.1, $SE = 0.284$, $p = <.001$). Similarly, for the GBA scores, ASD participants also reported significantly higher perceived social presence scores compared to non-ASD participants (estimate = 0.81, $SE = 0.284$, $p = .005$).

These findings suggest that while both groups reported higher perceived social presence in VCI compared to AVI and GBA, the difference in perceived social presence between ASD and non-ASD participants was more pronounced for AVI and GBA assessments. This indicates a need to consider the type of assessment when evaluating perceived social presence, as well as the potential impact of ASD on these perceptions across different contexts.

Figure 5

Mean Perceived Social Presence scores by assessment type and participant group



Note: $N = 51$ participants. $N = 25$ for ASD group, $N = 26$ for non-ASD group.

Discussion

The study aimed to explore the differences in anxiety and performance across different assessment types (VCI, AVI, GBA) in individuals with and without ASD.

Anxiety

The results did not support H1, H3, and H5 as no significant differences were found in anxiety levels between assessment type for both ASD and non-ASD groups. This suggests that anxiety levels experienced by individuals with ASD were comparable across AVI, VCI and GBA. These findings align with previous research indicating that the interview anxiety is a complex phenomenon influenced by various factors. Interviews are cognitively demanding tasks that require individuals to be in a social situation where they are being judged by the interviewer. Additionally, interviews demand the use of memory to think of an appropriate response and articulate them, which might further contribute to anxiety (Powell, Stanley, & Brown, 2018).

One possible explanation for lack of significant differences in anxiety levels across different assessments could be that the individuals in the sample, including both with ASD and non-ASD participants, might experience a baseline level of anxiety that remains relatively stable regardless of the type of interview. For example, White et al. (2009) study found that anxiety and poor stress management are common concerns in children and adolescents with ASD. Additionally, their anxiety may worsen as they engage in complex social situations and become more aware of their interpersonal difficulties (White et al., 2009). This persistent anxiety could be attributed to the inherent social and communicative challenges faced by individuals with ASD, which remain constant across various contexts (The Autism Society, 2022).

Interestingly, the observed anxiety levels for ASD participants were moderate (around or under 3 out of 5). This suggests that the structured environments of VCI, AVI, and GBA,

with clear rules and minimized social interaction, helped mitigate extreme anxiety.

Additionally, ASD participants may have developed coping mechanisms, contributing to consistent anxiety levels across settings. The non-ASD group might also have experienced anxiety due to the evaluative nature of assessments, further balancing anxiety levels between groups. The structured assessment environments likely contributed to the lack of significant differences.

While the descriptive statistics indicated slightly lower anxiety levels in GBA compared to VCI and AVI for both ASD and non-ASD groups, these differences were not statistically significant. This could suggest that the game based assessment format might inherently reduce anxiety to some extent. This could be due to the immersive and engaging nature of GBAs, which might distract participants from the evaluative aspect of the assessment (Georgiou et al., 2019). However, it is also possible that the adaptations provided in AVI and GBA (e.g., more preparation time, less social pressure) were not sufficient to significantly reduce anxiety levels compared to VCI.

Another factor to consider is the role of predictability and structure in reducing anxiety. Individuals with ASD often prefer same and predictable environments, and have difficulty with transition or changes in routine (American Psychiatric Association, 2000). While GBAs introduce novel elements, they also provide a structured environment with clear rules and objectives, which might help reduce anxiety compared to the less structured and more socially demanding VCIs and AVIs. The predictable nature of GBAs, with defined tasks and consistent feedback, may offer a sense of control and security that helps mitigate anxiety for individuals with ASD.

In summary, the stable baseline anxiety in ASD individuals, combined with structured assessment environments and potential coping strategies, resulted in moderate anxiety levels

and no significant differences between ASD and non ASD groups.

Performance

The performance results fully supported H2 and H4, but partially supported H6.

Individuals with ASD demonstrated significantly lower performance in VCI compared to those without ASD, supporting H2. This finding aligns with the literature suggesting that the social demands of video conference interviews may negatively impact individuals with ASD. Autistic individuals often find it difficult to communicate with the interviewers and verbalize their skills effectively, which can hinder their performance in such settings (Finn et al., 2023). The significant interaction between assessment type and participant group indicates that the performance of individuals with ASD is particularly affected by the social components of the VCI.

H4 was supported as individuals with ASD performed better in AVIs compared to VCIs. This is consistent with the findings of (Lukacik et al., 2022) who suggested that AVIs tend to have lower social bandwidth, meaning less relevant communication and information are exchanged, and there is lower interactivity between the interviewer and interviewee. This reduced social pressure in AVIs might explain why the individuals with ASD performed better in AVI compared to VCIs. However, it is important to note that AVIs still involve some level of social interaction, which may explain why the performance improvement, while significant, was not substantial as might be expected if the social interaction were entirely removed.

H6 was partially supported; individuals with ASD performed better in GBAs compared to VCIs but not significantly better in GBAs compared to AVIs. This suggests that while GBA provide a more controlled and engaging environment, the benefits over AVIs might not be substantial for individuals with ASD. Both GBAs and AVIs seem to help ASD individuals perform better by reducing social pressure compared to VCIs. Practically, this

means that both AVIs and GBAs could be used as fairer assessments for ASD applicants, accommodating their unique needs. One possible explanation for the lack of substantial performance improvement in GBAs compared to AVIs is that both assessments successfully reduce social pressure that negatively impacts ASD individuals' performance in VCIs. The structured, predictable, and less interactive nature of AVIs and GBAs offers a more comfortable environment for ASD individuals. The reduction in social demands appears to be sufficient in both AVIs and GBAs to enhance performance, without one significantly outperforming the other.

Another interesting finding was that while non-ASD participants showed higher performance across all assessment types compared to ASD participants, the gap was most pronounced in VCI. This supports the idea that the high social and communicative demands of video interviews disproportionately affect individuals with ASD (Powell et al., 2018). The performance gap narrowed in AVIs and was the smallest in GBAs, suggesting that these alternative assessments might provide a more level playing field for individuals with ASD.

Lastly, the higher performance in GBAs for both ASD and non-ASD groups could be attributed to the engaging and interactive nature of the game-based assessment, might enhance motivation and concentration (Covert et al., 2020). This aligns with theories suggesting that gamified assessments can lead to better performance by providing a more simulating and less stressful environment (Armstrong et al., 2016).

Perceived Fairness

Selection Procedural Justice scales

The hypothesis (H7) that individuals with ASD would perceive GBAs as fairer compared to AVI and VCIs was not supported by the results. Individuals with ASD did not show a significant preference for GBAs over AVIs and VCIs in terms of procedural justice. Interestingly, individuals without ASD perceived VCIs as significantly fairer in terms of

procedural justice than GBAs, with a trend suggesting that AVIs were also perceived as fairer than GBAs.

Individuals with ASD rated GBA and VCI similarly in terms of procedural justice, even though they performed much worse in VCIs. Conversely, the non-ASD group did not perceive the GBA as fair, rating it lower compared to VCI. One possible explanation for these findings is that individuals with ASD may not perceive the procedural aspects of different assessment types in the same way as neurotypical individuals do. For instance, for the ASD group, procedural justice scores were relatively consistent across VCI, AVI, and GBA, suggesting that their perceptions of fairness might not be as influenced by the format of the assessment as those of the non-ASD group. This aligns with the literature suggesting that individuals with ASD often focus more on the content and structure of the tasks rather than social dynamics (The Autism Society, 2022).

Another possibility is that individuals with ASD may not fully realize that they struggled more in the VCIs, meaning they might not have been aware that their performance was objectively weaker. This lack of awareness could stem from difficulties in self-monitoring and self-assessments, which are common among individuals with ASD (Ganz & Sigafoos, 2005). As a result, they may perceive the VCI as equally fair compared to other assessments, despite their lower performance.

The non-ASD group's preference for VCI over GBA might be attributed to the familiarity and structure of traditional interview formats. VCIs, despite being conducted virtually, retain many elements of face-to-face interviews such as direct interaction with the interviewer which may be perceived as more transparent and fairer (Basch et al., 2021). On the other hand, GBAs, while being engaging and exciting (Armstrong et al., 2016). They introduce elements that might be perceived as less predictable, more variable, potentially

imapcting fairness perceptions. This is supported by the significant difference found in procedural justice scores between VCI and GBA for the non ASD group.

Additionally, the significant interaction between assesment type and participant group suggests that the procedural justice perceptions are influenced by both the nature of the assesment and the characteristics of the participants. This interaction highlights the importance of considering individual differences in procedural justice research, particularly when implementing assesment tools.

Ease of Use

The results for ease of use suggested that participants regardless of their age group, found GBAs easier to use than AVIs, and found VCIs easier to use than AVIs. The higher ease of use scores for GBA among individuals with ASD align with previous research indicating that ASD individuals prefer predictable, structured environments with regular routine and little sensory stimulation (Muller et al., 2003). The predictability and clarity of rules in GBA might have contributed to their higher percieved ease of use.

While some GBAs can have significant amount of sensosry stimulation, the structured and predictable nature of the sensory input within these games might be more manageable for individuals with ASD compared to the potentially unpredictable sensory input in the AVIs. This aligns with previous research suggesting that individuals with ASD prefer environments with regular routines and strucutured stimuli (Muller et al., 2003). Therefore, the predictablity and clarity of rules in GBAs, despite the sensosry stiumuation, likely contribute to their higher perceived ease of use amongst individuals with ASD in my study.

For the ASD group, signinificantly lower ease of use scores for AVI compared to GBA and VCI might be attributed to unique demands of the AVIs. In AVIs, individuals are required to record their responses to pre defined questions without real time interaction (Lukacik et al., 2022). While AVIs reduce live social interaction, which could theoretically

ease anxiety, they also lack immediate feedback and require self regulation of the recording process. This can introduce additional cognitive load, making AVIs less user friendly for individuals with ASD who struggle with communication and social interaction (Gal et al., 2015).

Interestingly, the non-ASD group also reported lower ease of use scores for AVIs compared to VCIs and GBAs. This suggests that challenges associated with AVIs, such as absence of real time interaction and the need for self regulation are not exclusive for individuals with ASD. Additionally, it may be that AVIs are much less familiar to participants in general. The mean number of asynchronous video interviews (AVI) participants has completed in the past was $M = 0.92$ ($SD = 1.68$), indicating that participants had significantly less experience with AVIs. This lack of familiarity could make AVIs seem more complex and less user friendly compared to the more familiar VCI and GBA formats.

Social Presence

An interesting pattern emerged in social presence results as non-ASD participants reported much lower perceptions of social presence in AVI and GBA compared to ASD participants. This may indicate that ASD individuals might find these formats as more engaging or socially adequate compared to traditional formats, whereas non-ASD individuals might miss the higher levels of interaction found in VCIs. This highlights the importance of considering individual preference and experiences when conducting assessments.

Practical Implications

The findings have several practical implications for the selection process of individuals with ASD. Organisations should be cautious in using traditional VCIs for individuals with ASD due to the potential for lower performance. Instead, AVIs and GBAs could be more effective, providing a less socially demanding environment and potentially improving performance. However, the design of these alternative assessments should take into

account the preferences and strengths of individuals with ASD to enhance perceived fairness and reduce anxiety.

First, allowing participants to choose between different assessment methods (VCIs, AVIs, and GBAs) could accommodate diverse needs and preferences, acknowledging that individuals with ASD have unique strengths and challenges. This approach aligns with my study findings suggesting that both AVIs and GBAs help ASD individuals perform better compared to the more socially demanding VCIs. However, ensuring that these different methods are equivalent in predicting job performance is crucial. This study found that performance in VCI correlated with the performance in AVI, suggesting some degree of equivalence, while the correlation with GBA was lower, indicating a need for further validation.

Second, given that participants had significantly less experience with AVIs, organizations should provide preparatory materials or practice sessions to familiarize candidates with the format. This can help reduce anxiety and improve ease of use. Offering training or mock assessments can enhance comfort levels and potentially improve performance, as unfamiliarity with AVIs might contribute to perceived complexity and lower ease of use scores (Roulin et al., 2023).

Third, tailoring the design of the AVIs and GBAs to align with the preferences and strengths of the individuals with ASD can improve their experience and outcomes. This might include providing clear instructions, minimizing sensory overload, and allowing for extended preparation time. Additionally incorporating elements that reduce social pressure, such as allowing candidates to pause and resume assessments might be beneficial (Fisher et al., 2024). These modifications can help create a more structured and predictable environment, which is preferred by individuals with ASD (The Autism Society, 2022).

Lastly, balancing performance improvement with positive applicant reactions is essential. Ensuring that all assessment methods are perceived as fair and user friendly can enhance the overall candidate experience. Soliciting feedback from applicants about their assessment experience can provide valuable insights for further improvements. In this study I found that procedural justice perceptions varied, with ASD participants rating GBA and VCI similarly, whereas non-ASD participants rated VCI as fairer than GBA. Understanding these perceptions can guide the design of more inclusive assessments.

Limitations

The study had several limitations. The sample size was relatively small ($N = 51$), which may limit the generalizability of the findings. Additionally, while the sample was well educated, it may not be representative of the general ASD population. The graduation rate for Autistic population in the post-secondary sector is approximately 20% (Luey, 2014), which is significantly lower than that of my sample. This discrepancy suggests that my findings may not fully reflect the experiences of the broader ASD population. Future research should aim to include larger, more diverse samples to validate the results and increase their generalizability.

Secondly, the study relied on self report measures of anxiety, perceived social presence, and procedural justice, which maybe subject to social desirability bias. Although efforts were made to ensure reliability and validity of the measures, future studies should consider incorporating objective measures such as physiological indicators of anxiety to complement self reported data.

Additionally, this study focused on three assessment methods (VCI, AVI, and GBA), and did not explore other potential alternatives such as face-to-face interviews. Future research should investigate a broader range of assessments to provide a more comprehensive understanding of their suitability for individuals with ASD.

Another limitation is that the sample primarily consisted of participants recruited through Prolific, who were completing these assessments for research purposes, which are typically low-stake situations. It remains uncertain whether the findings would replicate in a high-stake context where real applicants are applying for actual job positions. The stakes involved in real world job applications could potentially influence anxiety levels and performance outcomes differently.

One potential limitation of this study is that I conducted the VCI and evaluated performance of candidates, which might have inadvertently introduced bias, especially since the group affiliation was known for MSVU, BC Autism and Fred Smithers Centre. While precautions were taken, such as using structured interviews and BARS to minimize bias, the possibility of bias cannot be entirely ruled out. Future studies should consider using blinded evaluators to further mitigate this issue.

For AVI ratings, even though I achieved a good agreement between myself and the RA on a small sample, ideally, two independent raters should assess all the videos, or at least a larger portion of them, to compute Intraclass Correlation Coefficients (ICCs), for a more robust measure of consistency. This was not feasible for my study, but future studies should take this into consideration as well.

The order of the assessments was not counterbalanced, which is another limitation. All participants completed the assessments in the order of VCI, AVI and then GBA. This lack of counterbalancing could have influenced the results, as the participants might have perceived subsequent assessments as easier after completing the VCIs, which were expected to have the least favourable outcomes. Future research should consider counterbalancing the order of assessments to mitigate this potential bias.

My study also faced challenges in recruiting and retaining participants. There were instances of high dropout rates, with several participants completing one of the three

assessments before discontinuing. However, the sample used in my analyses included only those participants who completed all three assessments. The attrition rate is an important factor that future studies should consider. Efforts should be made to understand the reasons behind participant drop out and to implement strategies to minimize it.

In summary, while the study provides valuable insights into the performance and anxiety levels of individuals with ASD across different assessment types, these limitations highlight the need for future research to confirm and expand upon the findings. Future studies should aim for larger, more diverse samples, consider high stake contexts, utilize objective measures of anxiety, and explore a wider range of assessment methods.

Future Research

Future research should build on the findings of this study by exploring several key areas. First, there is a need for longitudinal studies to examine the long-term effects of different assessment methods on job performance among individuals with ASD. Understanding how these methods impact candidates' success and satisfaction in the workplace over time will provide valuable insights for organizations.

Second, future studies could also investigate the specific elements of GBA that could contribute to perceived ease of use and fairness. By identifying the design features that make GBAs more accessible and engaging for individuals with ASD, researchers can provide practical recommendations for developing effective assessment tools.

Additionally, addressing the limitations of the current study, future research should include larger, more diverse samples to enhance the generalizability of the findings. Recruiting participants from various sources beyond Prolific and focusing on real job applicants in high-stake situations, could provide a more accurate representation of how different assessment methods perform in practical settings.

Finally, future research could explore the potential benefits of hybrid assessment methods that combine elements of VCIs, AVIs, and GBAs. Hybrid approaches may offer a balanced solution that leverages the strengths of each method while mitigating their limitations. For example, a hybrid assessment could involve the following steps: Candidates start with a GBA designed to assess specific competencies related to the job. Throughout the game, candidates encounter embedded asynchronous video interview (AVI) questions. For instance, after completing the game, a question pops up asking the candidate to explain their strategy or how they would apply a similar approach to a real-world job scenario. This approach maintains the engaging and less stressful nature of GBAs while beginning to incorporate elements of self-paced video responses. Additionally, during the GBA, there could short interactive video segments where candidates are required to interact with prerecorded scenarios, for instance, they might watch a brief video clip of a workplace situation and then record their response to it. This integrates AVI format directly into the GBA, providing a mix of engagement and assessment without transitioning between distinct phases. Finally, after completing the GBA with embedded AVI elements, candidates could have a brief live video interview. This live interview could be focused on clarifying responses given during the GBA or AVI, allowing candidates to elaborate on their answers and demonstrate their social and communication skills in a more controlled and familiar context, reducing stress compared to a full-length interview.

By blending these elements into a single, continuous process, the hybrid method might provide a more seamless and holistic assessment experience. This approach could better accommodate the unique needs of individuals with ASD by reducing transitions between different assessment types and maintaining a consistent, engaging environment, throughout the evaluation.

Conclusion

In conclusion, this study contributes to the growing body of literature on inclusive selection practices for individuals with ASD. The findings highlight the limitations of traditional VCIs, and the potential benefits of incorporating AVIs and GBAs into the selection process. By providing a more structured and engaging environment, GBAs, in particular, can help reduce social pressure and anxiety associated with traditional interview formats.

However, this study also underscores the need to address usability challenges associated with AVIs and to consider user experience when designing assessment tools. Organisations should explore ways to enhance the usability of AVIs and in developing GBAs that are tailored to assess relevant skills and competencies in a way that is accessible and fair for all candidates.

Overall, this study emphasizes the importance of creating inclusive and equitable selection process that accommodates the diverse needs of all candidates, including those with ASD. By leveraging the strengths of different assessment methods and addressing their limitations, organisations can improve their selection practices and support the success of individuals with ASD in the workplace.

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Appendices

Appendix A

Join Our Team as an Assistant Store Manager

Are you ready to take the next step in your retail career? We are seeking dedicated individuals who are passionate about providing exceptional customer experiences and ensuring the smooth operation of our stores. As an Assistant Store Manager, you'll play a crucial role in achieving our goals and fostering a collaborative work environment.

Job Description:

Assistant Manager helps organize and run our retail stores and fill in for the Store Manager when needed. Your job will be highly important in ensuring the sales team meets its goals of efficiency and customer satisfaction. Additionally, individuals in this role contribute to the successful and efficient functioning of the store through a collaborative effort.

Responsibilities of the Store Assistant Manager:

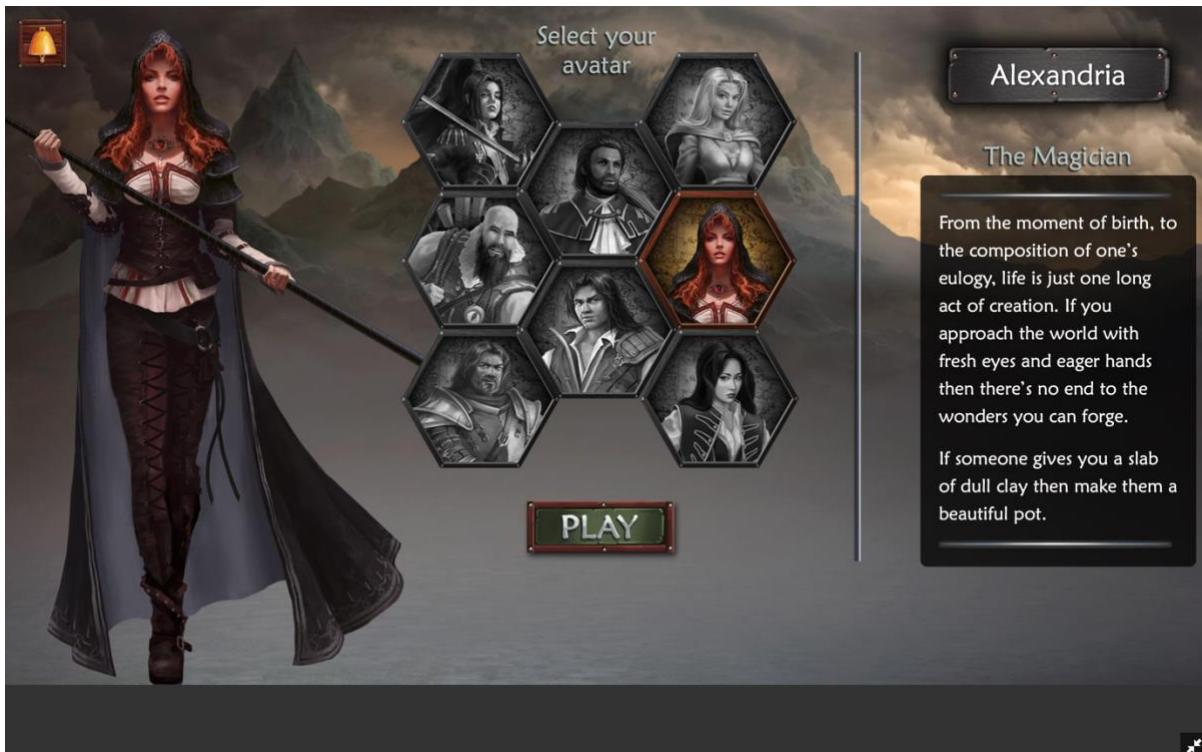
- Assist the Retail Store Manager in planning and implementing strategies to attract customers
- Coordinate daily customer service operations
- Communicate with clients and evaluate their needs
- Supervise and motivate staff to perform their best
- Monitor and maintain store inventory
- Conduct regular audits to ensure the store is functional and presentable
- Make sure all employees adhere to the company's policies and guidelines
- Act as our store's representative and set an example for our staff

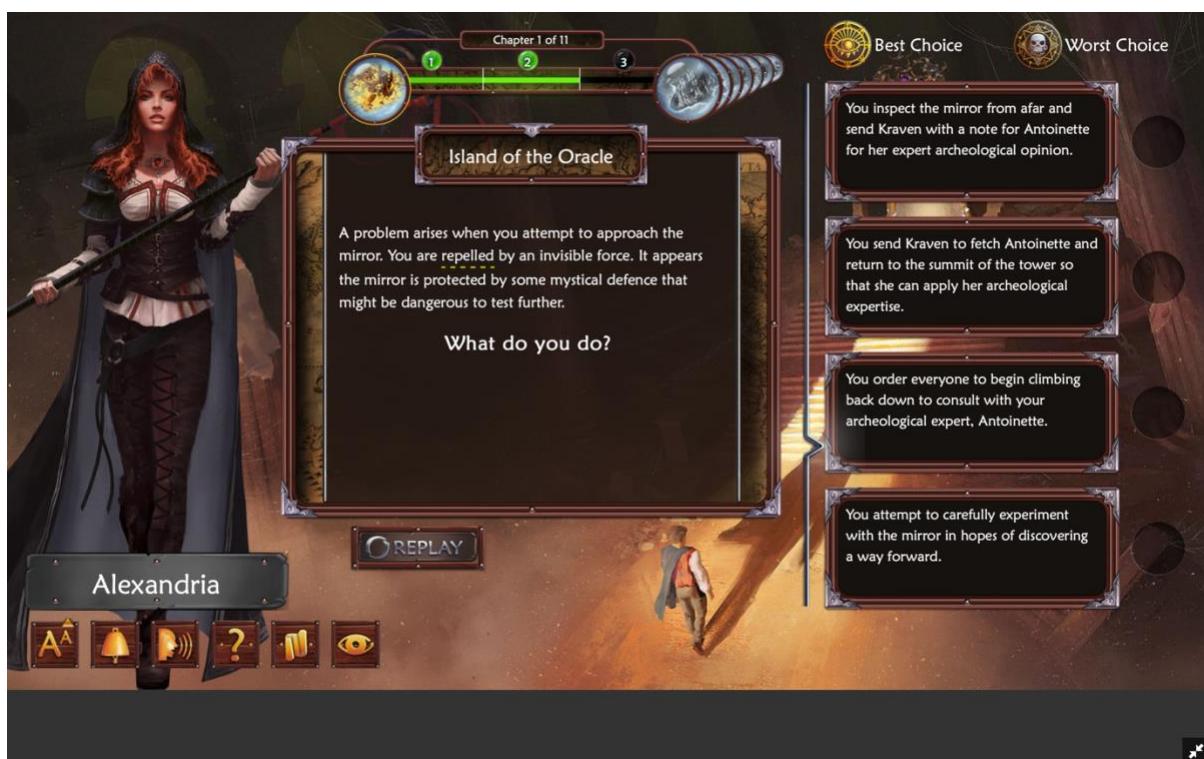
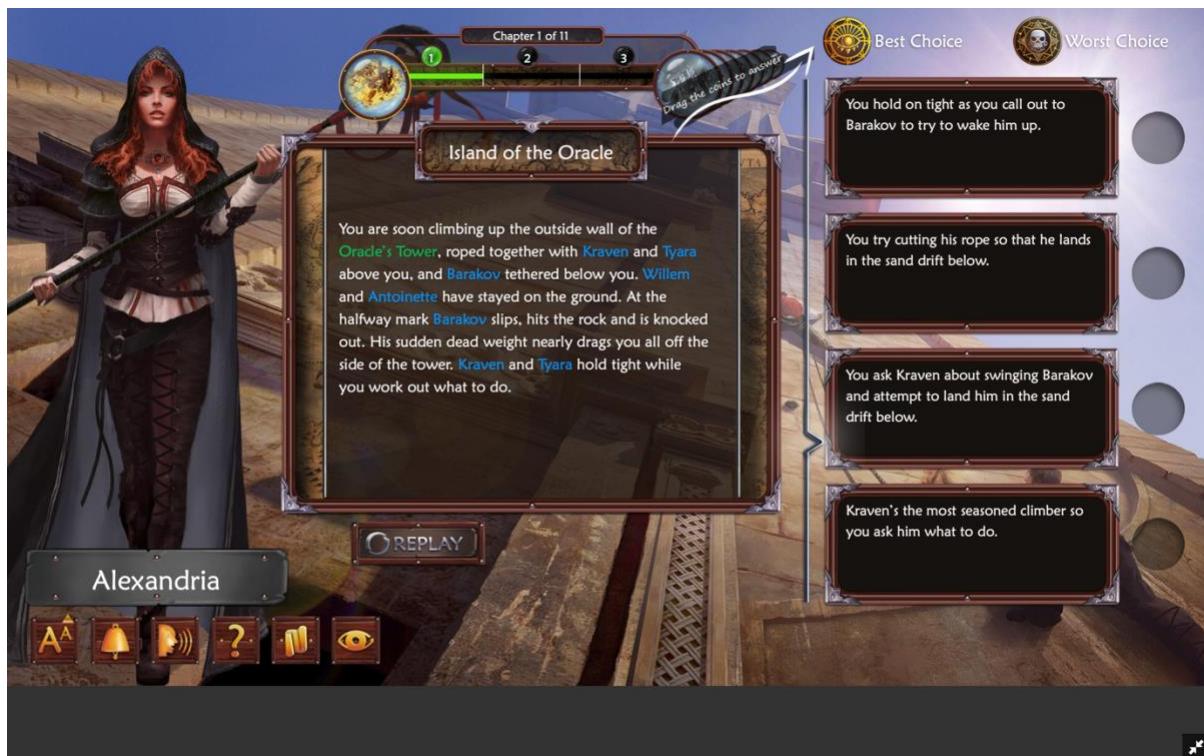
Qualifications:

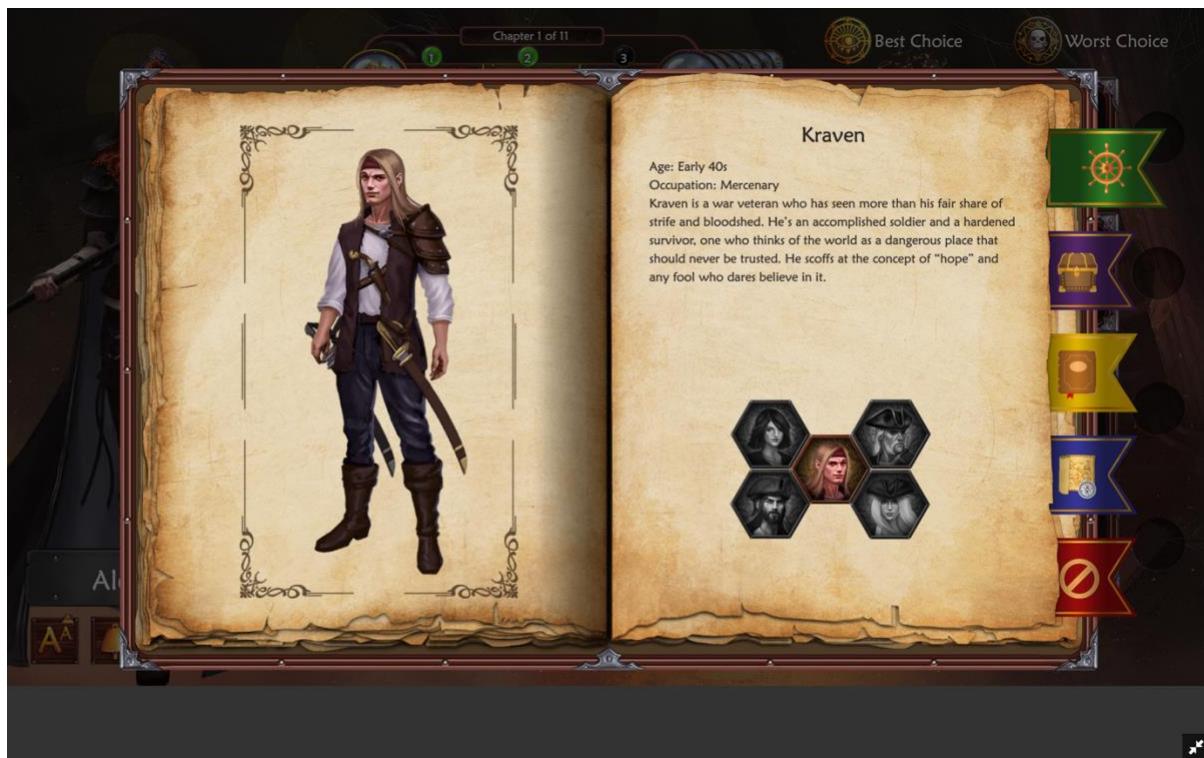
- A passion for delivering outstanding customer service.
- Exceptional communication skills.
- Friendly, Enthusiastic, Outgoing and full of energy
- Must work well with the entire sales team
- Experience is an asset but not required
- Self-starter and uses good judgment in all situations.

If you're ready to make a difference in a dynamic retail environment, we encourage you to apply and join our team as an Assistant Store Manager. Your contributions will help create a positive shopping experience for our customers and contribute to our overall success.

Appendix B







Appendix C

OWIWI SKILLS.

1. TEAMWORK
2. DECISION MAKING
3. ADAPTABILITY
4. RESILIENCE
5. INTEGRITY

From: Salimian Rizi, M. & Roulin, N. (in press). Does media richness influence job applicants' experience in asynchronous video interviews? Examining social presence, impression management, anxiety, and performance. International Journal of Selection and Assessment

#	Skill assessed	Question
Q1	Teamwork #1	Imagine you are a manager supervising employees in the produce section of a grocery store. Over the past few days, two of your team members have been arguing about who should do certain tasks, such as restocking the shelves or answering customer questions. Their disagreements ended up in a heated argument this morning, during which inappropriate language and insults were exchanged. The two colleagues now refuse to work with each other, and one left for the lunch break and did not come back. What would you do to manage this situation, while ensuring that the customers receive proper service?
Evaluation		
1		Ignores the employee who has left or tries to involve the higher authorities outside of the team or tries to use coercive force to make employees return to work.
2		Does not evaluate the situation properly to decide how the tasks can be reassigned between other team members so that the workflow continues. Makes some changes in the assignments and tasks but does not pay attention to the morale and motivation of other team members. Tries to resolve the conflict but does not do it effectively.
3		Evaluates the situation and reassign tasks among other team members in order to keep the work going and ensuring that the customers are receiving service. Then communicates effectively with both problematic employees and mediate between two employees to reach a mutual understanding and a voluntary agreement between them
4		Evaluates the situation and reassign tasks among other team members in order to keep the work going and ensuring that the customers are receiving service. Additionally, communicates with the rest of the team to keep the morale high and keep the cohesion of the team. Then communicates effectively with both problematic employees and mediate between two employees to reach a mutual understanding and a voluntary agreement between them and directs them towards the work goals rather than interpersonal disagreements.

5	Evaluates the situation and reassign tasks among other team members in order to keep the work going and ensuring that the customers are receiving service. Additionally, communicates with the rest of the team to keep the morale high and keep the cohesion of the team. Then communicates effectively with both problematic employees and mediate between two employees to reach a mutual understanding and a voluntary agreement between them and directs them towards the work goals rather than interpersonal disagreements. Encourages respect and cooperation. Tries to focus both employees on the task conflict rather than allowing the conflict to escalate to the relational conflict and helps to solve the problem on the task level and repair the relationship.
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From: Roulin, N., Pham, L.K.A., & Bourdage, J.S.. (2023). Ready? Camera rolling... Action! Examining interviewee training and practice opportunities in asynchronous video interviews. Journal of Vocational Behavior, 145, 103912. <https://doi.org/10.1016/j.jvb.2023.103912>

#	Skill assessed	Question
Q2	Teamwork #2	Describe a time when you had to collaborate or partner with others to succeed at a task. What was the task you had to accomplish? What made the collaboration successful? What was your role or contribution?
Evaluation		
1		Features of the task, situation and/or the individual's role/contribution are unclear or are not discussed/mentioned (i.e., parts of the question were not answered or addressed at all). No collaboration occurred, or the individual was not collaborative (e.g., contributed very little, or completed all work without the contribution of others), or; Collaboration was not needed to accomplish the task.
2		Shared a specific example of collaboration, but the features of the task, situation, and/or the individual's role/contribution are quite vague. Most parts of the question are addressed. The situation involved and required limited collaboration (i.e., the task requires some kind of co-dependency on others). The task clearly would have been more successful if the individual was more collaborative (e.g., by actively communicating with others, contributing to group tasks); the individual was only partially successful at working collaboratively with others. Briefly considered/discussed a few of the behaviors and actions that helped and/or hindered the success of the collaborative effort, but their discussion was not very thorough or detailed (e.g., did not provide any examples to back up claims). The individual was "passively collaborative," e.g., did what was told by other group members but did not actively initiate or encourage other collaborative actions/behaviors.
3		Features of the task, situation, and/or the individual's role/contribution are generally clear. All parts of the question are addressed. The situation involved and required collaboration (i.e., the task requires clear co-dependency on others). The task was accomplished but could have been even more successful if the individual was more collaborative (e.g., by increasing the frequency of communication with others, contributing more to group tasks).

	<p>Considered/discussed several behaviors and actions that helped and/or hindered the success of the collaborative effort, but their discussion could have been more detailed (e.g., provide more specific examples to back up claims).</p> <p>The individual was “passively collaborative” (e.g., did what was told by other group members), but did not actively initiate or encourage other collaborative actions/behaviors.</p>
4	<p>Described a clear and specific example of collaboration, discussed the features of the task, situation, and the individual’s role/contribution in a well-rounded manner.</p> <p>The situation involved and required collaboration.</p> <p>The individual actively helped create and/or sustain a collaborative environment (e.g., kept other team members informed of project-related tasks or progress, scheduled team meetings, provided feedback when requested).</p> <p>The behaviors and actions that made the collaborative effort successful are considered and described (e.g., by using examples), and/or;</p> <p>The behaviors and actions that would have made the collaborative effort more successful are considered.</p>
5	<p>Features of the task, situation, and/or the individual’s role/contribution are very clear. All parts of the question were thoroughly addressed.</p> <p>The situation involved and required collaboration.</p> <p>The individual actively helped create and/or sustain a collaborative environment (e.g., kept other team members informed of project-related tasks or progress, scheduled team meetings, provided feedback when requested).</p> <p>The behaviors and actions that made the collaborative effort successful are thoroughly considered and clearly described (e.g., with detailed and relevant examples), and/or;</p> <p>The behaviors and actions that would have made the collaborative effort more successful are thoroughly considered.</p>

From: Salimian Rizi, M. & Roulin, N. (in press). Does media richness influence job applicants’ experience in asynchronous video interviews? Examining social presence, impression management, anxiety, and performance. International Journal of Selection and Assessment

#	Skill assessed	Question
Q3	Integrity #1	Tell me about a time you experienced failure. How did you resolve or correct the situation to save face?
Evaluation		
1		Says she/he has never experienced failure or explains a very minor failure.
2		Explains a failure but does not accept the responsibility and instead blames other people or situational factors... or tries to associate the failure with positive characteristics (e.g., caring too much, being perfectionist, etc.)

3	Accepts the responsibility for the failure and doesn't push the blame on others, or the situation, or the economy (or generally the lack of anything external). Took the necessary steps to correct the mistake, but did not go beyond that.
4	Accepts the responsibility for the failure and doesn't push the blame on others, or the situation, or the economy (or generally the lack of anything external). Analyzes the reason(s) for failure (e.g., setting too ambitious goals). Took the necessary steps to correct the mistake. He/she learned some lessons from experience about him/herself.
5	Accepts the responsibility for the failure and doesn't push the blame on others, or the situation, or the economy (or generally the lack of anything external). Analyzes the reason for failure (e.g., setting too ambitious goals). Took the necessary steps to correct the mistake. He/she learned some lessons from the experience about him/herself and looks at the failure as a learning experience. Also learned what to do next time and took steps to ensure the issue won't happen again.

#	Skill assessed	Question
Q4	Integrity #2	Imagine that you are working in construction, and you are asked to replace a colleague who called in sick. You are instructed to inspect the recently completed installation of all the plumbing components in a new apartment building downtown. While inspecting plumbing equipment in the basement of the building, you notice wiring coming out of a set of electrical panels. Upon closer examination, you realize that although each panel was properly installed, the way they were connected together may violate code. When you point this out to the builders, they explain that they were pressured by their client to complete the project quickly and took some shortcuts. But they claim that this was already inspected and approved by your colleague a week ago, and they even show you the inspection report. What would you do in this situation?
Evaluation		
1	Chooses to ignore the wiring issue, deciding not to confront the builders or report the problem. Prioritizes avoiding conflict over safety and adherence to regulations.	
2	Notices the wiring issue but hesitates to take action. May consider discussing it with a colleague but ultimately does not report the problem to the appropriate authorities. Allows external pressures to influence the decision.	
3	Recognizes the wiring issue and promptly reports it to the relevant authorities, putting safety and adherence to regulations above all else. Acknowledges the client's pressure but does not compromise on integrity.	

4	Recognizes the wiring issue and promptly reports it to the relevant authorities. Engages in a constructive conversation with the builders about the problem, emphasizing the importance to codes and standards. Demonstrates a commitment to integrity.
5	Recognizes the wiring issue and promptly reports it to the relevant authorities. Engages in a constructive conversation with the builders about the problem, emphasizing the importance to codes and standards. Takes proactive steps to ensure that the issue is addressed promptly, and future projects maintain the highest standards of integrity. Displays exceptional commitment to integrity, safety and professionalism.

From: Roulin, N., Pham, L.K.A., & Bourdage, J.S.. (2023). Ready? Camera rolling... Action! Examining interviewee training and practice opportunities in asynchronous video interviews. Journal of Vocational Behavior, 145, 103912. <https://doi.org/10.1016/j.jvb.2023.103912>

#	Skill assessed	Question
Q5	Resilience #1	Can you describe a situation where you received negative feedback from clients or customers on a project? What was the reason for the evaluation, and how did you handle it?
Evaluation		
1		No situation is described and/or actions do not demonstrate personal growth / learning. Examples might include: <ul style="list-style-type: none"> ○ suggesting that there is nothing they can do so they will just move on ○ not acknowledging their mistakes nor holding themselves accountable (e.g. defensively explaining that the clients' requests were unrealistic) ○ communicating with client in a defensive way ○ not developing any strategies to avoid potentially similar problems in the future.
2		A situation is described, but it lacks a clear demonstration of growth/learning, or it includes undesirable behaviors alongside desirable ones. <ul style="list-style-type: none"> - The individual mentions a vague example where they received negative feedback from clients or customers on a project. - They acknowledge the feedback, but demonstrate very limited reflection on it, showing only some awareness of their mistakes or areas for improvement. - There is no (or only very limited) attempt to take some responsibility for the situation. - The response shows very minimal willingness to learn or listen to feedback. - There is no clear indication of developing strategies to avoid similar problems.

	<ul style="list-style-type: none"> - Overall, the response demonstrates resilience and growth to a weak extent, and there is ample room for further development and detail in the reflection and action taken.
3	<p>A situation is adequately described and somewhat demonstrates growth / learning.</p> <ul style="list-style-type: none"> - The individual mentions a specific instance where they received negative feedback from clients or customers on a project. - They acknowledge the feedback and show a degree of reflection on it, demonstrating a general understanding of their mistakes and areas for improvement. - There is an effort to take responsibility for the situation. - The response includes elements of constructive communication, such as showing willingness to learn and listen to feedback. - Indications of preliminary (but superficial) taking steps to avoid similar problems in the future. - Overall, the response displays resilience and growth, but there is some room for further development, reflection, and details for the action taken.
4	<p>A situation is clearly described, and it demonstrates growth/learning.</p> <ul style="list-style-type: none"> - The individual provides a detailed account of a specific situation where they received negative feedback from clients or customers on a project. - They acknowledge the feedback and show good reflection on it, demonstrating an understanding of their mistakes and areas for improvement. - Clear effort to take responsibility for the situation, although it may not be as thorough as in a score of 5. - The response includes several elements of constructive communication, such as showing willingness to learn and listen to feedback. - While there may not be a comprehensive set of strategies, there are clear indications of taking steps to avoid similar problems in the future. - Overall, the response displays resilience and growth, with room for further development in the depth of reflection and the detail of action taken.
5	<p>A situation is clearly described and strongly demonstrates growth / learning. Actions include <u>all</u> of the following elements:</p> <ul style="list-style-type: none"> o reflecting upon the feedback received, trying to identify causes of the problem or poor performance, and find effective ways to improve o acknowledging their flaws and taking responsibility for it o communicating with the client/customer in a constructive way (e.g. eager to learn and listen to the feedback provided) o developing specific strategies to avoid potentially similar problems in the future, and highlighting steps to implement them.

From: Arseneault, R. & Roulin, N. Investigating impression management use in asynchronous video interviews across 10 countries. (under review in International Journal of Human Resource Management).

#	Skill assessed	Question
Q6	Resilience #2	Tell me about a school or work situation where you made a memorable mistake and explain how you handled it?
Evaluation		
1		<p>No situation is described, and/or actions do not demonstrate personal growth / resilience. Examples might include:</p> <ul style="list-style-type: none"> ○ suggesting that there is nothing they can do so they will just move on ○ not acknowledging their mistakes and holding themselves accountable (e.g., blaming others or external factors) ○ Avoiding dealing with people who were affected. ○ not developing any strategies or plans to avoid the same mistake in the future. <p>The candidate's example is not related to an academic or work setting.</p>
2		<p>A situation is described, but it lacks a clear demonstration of growth/learning, or it includes undesirable behaviors alongside desirable ones.</p> <ul style="list-style-type: none"> -The individual mentions a vague example where they made a mistake. -They acknowledge the mistake, but demonstrate very limited reflection on it, showing only some awareness of their mistakes or areas for improvement. <p>There is no (or only very limited) attempt to take responsibility for the situation.</p> <ul style="list-style-type: none"> - The response shows very minimal willingness to learn. - There is no clear indication of developing strategies to avoid similar problems. <p>Overall, the response demonstrates resilience and growth to a weak extent, and there is ample room for further development and detail in the reflection and action taken.</p>
3		<p>A situation is adequately described and somewhat demonstrates growth / learning.</p> <ul style="list-style-type: none"> - The individual mentions a specific example where they made a mistake. - They acknowledge the mistake and show a degree of reflection on it, demonstrating a general understanding of their mistakes and areas for improvement. - There is an effort to take responsibility for the situation. - Indications of preliminary (but superficial) taking steps to avoid similar problems in the future. <p>Overall, the response displays resilience and growth, but there is some room for further development, reflection, and details for the action taken.</p>
4		<p>A situation is clearly described and demonstrates some growth/learning.</p> <ul style="list-style-type: none"> -The individual provides a detailed account of a specific situation where they made a mistake. - They acknowledge the mistake and show good reflection on it, demonstrating an understanding of their mistakes and areas for improvement. - Clear effort to take responsibility for the situation, although it may not be as thorough as in a score of 5.

	<p>- While there may not be a comprehensive set of strategies, there are clear indications of taking steps to avoid similar problems in the future.</p> <p>Overall, the response displays resilience and growth, with room for further development in the depth of reflection and the detail of action taken.</p>
5	<p>A situation is clearly described and strongly demonstrates resilience and growth</p> <p>Actions may include all the following elements:</p> <ul style="list-style-type: none"> ○ critically reflecting upon mistake, trying to identify causes of the problem or poor performance, and find effective solutions. ○ acknowledging the mistake and taking responsibility for it ○ communicating to people who were affected (or expressed desire to do so) ○ developing specific strategies to avoid potentially similar problems in the future. and highlighting steps to implement them. <p>The candidate's example demonstrates their resilience and growth aptitude in an academic- or work-related setting and their actions/steps could be used and modelled in different situations.</p>

Roulin N. (2022). The psychology of job interviews, 2nd Edition. Abingdon, UK: Routledge. ISBN-13: 978-0-367-77378-6

#	Skill assessed	Question
Q7	Adaptability #1	You are the assistant manager of a bar at an international airport. The weather is very bad today, and you hear an announcement that all departing flights will be delayed for the next four to five hours. It is likely that an unusually high number of passengers will come to your bar to drink or eat something while waiting. How do you react in this situation?
Evaluation		
1		<p>Expects to face a stressful situation without making any specific change. Example response: Anticipates a large number of clients and realizes that the next few hours will be stressful. Yet, no further analysis of the situation is conducted, and no changes are made to adapt (e.g., about stocks, number of employees).</p>
2		<p>Anticipates an issue to arise, but only engages in minimal actions without collecting all necessary information. Example response: Takes the newly received information into account and supposes that there may be not enough food supplies at the bar. Sends a waiter to obtain additional supplies in the stocks or in a store.</p>

3	<p>Tries to quickly obtain a proxy of the information required to do one's job and evaluates the overall needs and changes to make.</p> <p>Example response: Looks at the number of delayed flights to estimate the number of passengers and thus additional customers. Quickly estimates the required supplies and compares this number to supplies available at the bar. Calls people in charge of stocks or delivery to ask about the availability of additional supplies.</p>
4	<p>Obtains pertinent information to do one's job effectively, evaluates the overall needs, and acts on required adaptations.</p> <p>Example response: Talks with flight attendants to obtain a general estimation of the number of delayed passengers. Compares this number to supplies available at the bar. If necessary, calls people in charge of stocks or delivery to obtain additional emergency supplies.</p>
5	<p>Analyzes the potential gap between requirements and available resources, takes the initiative to obtain useful and necessary information to make appropriate decisions, and engages in an appropriate process to solve the problem.</p> <p>Example response: Contacts airport administration or airlines to obtain a precise number of delayed passengers and more information about the delay. Compares this number to supplies available at the bar. If necessary, calls people in charge of stocks or delivery to obtain additional emergency supplies. Calls additional (part-time) employees to come help with service.</p>

From: Salimian Rizi, M. & Roulin, N. (in press). Does media richness influence job applicants' experience in asynchronous video interviews? Examining social presence, impression management, anxiety, and performance. International Journal of Selection and Assessment

#	Skill assessed	Question
Q8	Adaptability #2	You are the assistant manager of a grocery store. A public weather alert is announced by Environment Canada unexpectedly, warning that a heavy snowstorm will be over your area for the next few days, starting in the next 24 hours. It is likely that an unusually high number of customers will be coming to your store today to shop for groceries and emergency items last minute. How do you react to this situation?
Evaluation		
1		Expects to face a stressful situation without making any specific change. Is uncertain of the appropriate actions.
2		Expects to face a stressful situation, but only collects minimum information and engages in minimal actions.

3	Tries to quickly obtain some required information to prepare for the situation and evaluates the overall needs and changes to make. Plans for taking some actions when the problems arise (does not plan to prevent them). Allocates resources (products and goods) but does not take any action to prepare the staff.
4	Obtains pertinent information to perform effectively in the emergency situation, and evaluates the overall needs, and acts on required adaptations. Allocates resources (goods, equipment, extra staff) to accommodate workflow. Acts in a calm, yet firm manner. Takes some action to regulates the assignments and responsibilities of subordinate employees to ensure they are prepared for the emergency.
5	Analyzes the potential gap between requirements and available resources, takes the initiative to obtain the useful and necessary information to make appropriate decisions, and prepares to engage in an appropriate process to solve the problem as they arise. Allocates resources (goods, equipment, extra staff) to accommodate workflow. Regulates the assignments and responsibilities of subordinate employees to ensure they are prepared for the emergency and reassigns tasks when necessary. Acts in a calm, yet firm manner and also helps others to keep calm and focused.

#	Skill assessed	Question
Q9	Decision Making #1	Describe a situation where you had to evaluate the risks, benefits, and potential outcomes associated with a decision – for instance, buying something important, investing in something, starting a new project, etc. How did you handle it?
Evaluation		
1		Did not provide a specific example or provided an example where risks, benefits and potential outcomes were not considered. Demonstrated a lack of understanding of the decision making process.
2		Provided a vague or unclear examples of a decision but failed to discuss the evaluation of risks, benefits or potential outcomes. Showed limited ability to analyse complex decisions.
3		Shared a specific example of a decision but did not thoroughly evaluate the risks, benefits or potential outcomes. Demonstrated some understanding of the decision-making process but lacked depth.
4		Presented a clear and specific examples of a decision and discussed the evaluation of risks, benefits and potential outcomes. Showed the ability to analyze and consider different aspects of a decision.
5		Described a compelling and detailed example of a decision, thoroughly evaluating the risks, benefits, and potential outcomes. Demonstrated excellent analytical skills, strategic thinking, and the ability to make well informed decisions.

#	Skill assessed	Question
Q10	Decision Making #2	Tell me about a time when you had to choose among several alternatives to invest important resources (like time, money, personnel, etc.). How did you approach this situation, and what did you decide?
Evaluation		
1		Did not provide a specific example or provided an example where resource allocation decisions were not discussed. Demonstrated a lack of understanding of resource allocation and decision making.
2		Provided a vague or unclear examples of a resource allocation decision but failed to discuss a structured approach or rationale for the choice. Showed limited ability to consider and evaluate alternatives.
3		Shared a specific example of a resource allocation decision and discussed some factors considered. Demonstrated a basic understanding of resource allocation but lacked depth in the decision making process.
4		Described a clear and specific example of a resource allocation decision, discussed the factors considered and explained the rationale for the choice. Showed the ability to analyze and prioritize alternatives effectively.
5		Described a compelling and detailed example of a resource allocation decision, thoroughly explaining the approach, considering various factors, and justifying the chosen alternative. Demonstrated excellent analytical skills, strategic thinking, and the ability to make well informed resource allocation decisions.

Appendix D

Interview Anxiety:

Communication Anxiety

1. I became so apprehensive in the interview that I was unable to express my thoughts clearly.
2. I got so anxious while in the interview that I had trouble answering questions that I knew.
3. During the interview, I often couldn't think of a thing to say.
4. I felt that my verbal communication skills were strong.*
5. During the interview I found it hard to understand what the interviewer was asking me.
6. I found it easy to communicate my personal accomplishments during the interview.*

Social Anxiety

7. While in the interview, I became concerned that the interviewer would perceive me as socially awkward.
 8. I became very uptight about having to record my responses for an interviewer.
 9. I was afraid about what kind of personal impression I was making on the interviewers.
 10. During the interview, I worried that my actions would not be considered socially appropriate.
11. I worried about whether the interviewers would like me as a person.

Performance Anxiety

12. In the interview, I got very nervous about whether my performance was good enough.
13. I was overwhelmed by thoughts of doing poorly when I was in the interview.
14. I worry that my interview performance will be lower than that of other applicants.

15. During the interview, I was so troubled by thoughts of failing that my performance was reduced.

16. During the interview, I was worried about what would happen if I didn't perform well.

17. While in the interview, I was worried about whether I would be a good candidate for the job.

Notes:

- Items are rated on a 5-point response scale: 1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral*, 4 = *agree*, 5 = *strongly agree*.
- Items with * indicate reversed-keyed items.

Appendix E

Ease of use (Interviews; AVI/VCI)

1. I found it easy to complete the video interview.
2. I found it easy to make the video interview program do what I wanted it to do.
3. My interaction with the video interview program was clear and understandable.
4. Interacting with a video interview felt flexible to me.
5. Completing a video interview was easy for me.

Ease of use (GBA)

1. I found it easy to complete the gamified assessment.
2. I found it easy to make a program for gamified assessment do what I wanted it to do.
3. My interaction with a program for gamified assessment was clear and understandable.
4. Interacting with a gamified assessment felt flexible to me.
5. Completing a gamified assessment was easy for me.

Appendix F

Perceived Social Presence Scale

Please respond to the following questions about how you were feeling during the interview.

- There was a sense of human contact in this interview
- There was a sense of personalness in this interview
- There was a sense of sociability in this interview
- There was a sense of human warmth in this interview
- There was a sense of human sensitivity in this interview

Perceived Social Presence Scale (GBA)

Please respond to the following questions about how you were feeling during the gamified assessment.

- There was a sense of human contact in this gamified assessment.
- There was a sense of personalness in this gamified assessment.
- There was a sense of sociability in this gamified assessment.
- There was a sense of human warmth in this gamified assessment.
- There was a sense of human sensitivity in this gamified assessment.

Appendix G

*Final Items for the Selection Procedural Justice Scale (SPJS) Strongly disagree = 1,
Disagree = 2, Neither agree nor disagree = 3,*

Agree = 4, Strongly agree = 5

Structure Higher-Order Factor Subscales

Job-relatedness-Predictive

Doing well on this test means a person can do the [insert job title] job well.
A person who scored well on this test will be a good [insert job title].

Information Known

I understood in advance what the testing processes would be like.
I knew what to expect on the test.
I had ample information about what the format of the test would be.

Chance to Perform

I could really show my skills and abilities through this test.
This test allowed me to show what my job skills are.
This test gives applicants the opportunity to show what they can really do.
I was able to show what I can do on this test.

Reconsideration Opportunity

I was given ample opportunity to have my test results rechecked, if necessary.
There was a chance to discuss my test results with someone.
I feel satisfied with the process for reviewing my test results. Applicants were able to have their test results reviewed if they wanted. The opportunities for reviewing my test results were adequate.

Feedback

I had a clear understanding of when I would get my test results.
I knew when I would receive feedback about my test results.
I was satisfied with the amount of time it took to get feedback on my test results.

Social Higher-Order Factor Subscales

Consistency

The test was administered to all applicants in the same way.

There were no differences in the way the test was administered to different applicants.
Test administrators made no distinction in how they treated applicants.

Openness

I was treated honestly and openly during the testing process.
Test administrators were candid when answering questions during the tests.
Test administrators answered procedural questions in a straightforward and sincere manner.
Test administrators did not try to hide anything from me during the testing process.

Treatment

I was treated politely during the testing process.

The test administrators were considerate during the test.

The test administrators treated applicants with respect during today's testing process.

The testing staff put me at ease when I took the test.

I was satisfied with my treatment at the test site.

Two-way Communication

There was enough communication during the testing process.

I was able to ask questions about the test.

I am satisfied with the communication that occurred during the test-ing process.

I would have felt comfortable asking questions about the test if I had any.

I was comfortable with the idea of expressing my concerns at the test site.

Propriety of Questions

The content of the test did not appear to be prejudiced. The test itself did not seem too personal or private. The content of the test seemed appropriate.

Job-relatedness Content

It would be clear to anyone that this test is related to the *[insert job title]* job.

The content of the test was clearly related to the *[insert job title]* job.

Note: Italics indicate phrases that may be changed to fit the research setting. In addition, the word "test" could be replaced with other selection devices or with a global term such as "the selection process" as appropriate.

Appendix H

Part II

Demographic Information (only included in the survey following Phase 1)

Are you diagnosed with Autism Spectrum Disorder?

Yes

No

What is your gender?

Male

Female

Other, please specify if you wish (specifying is not required): _____

What is your age? (in years)

Do you reside in Canada?

Yes

No

What is your ethnicity?

a) Asian

b) Black

c) White/Caucasian

d) Middle Eastern

e) Latino

f) First Nation

g) Other:

How many years of work experience do you have? Please enter whole numbers (e.g., 5):

How many years of managerial experience do you have? Please enter whole numbers:

How many in-person job interviews have you completed in the past? Please enter whole numbers: _____

How many video-conference interviews (i.e., live online interview via MS Teams, Zoom, etc.) have you completed in the past? Please enter whole numbers: _____

If yes, how many asynchronous video interviews (i.e., video-recording your responses for a manager to review later) have you completed in the past? Please enter whole numbers:
