Nonverbal Behaviour as a Cue for Vulnerability: Examining ASD and ADHD Suspects in Investigative Interviewing

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Abstract

Investigative interviews rely on rapport-building and memory recall to obtain accurate and reliable information from a suspect. However, individuals with autism spectrum disorder and/or attention deficit hyperactivity disorder (referred to as AuDHD) may experience differences in memory recall and rapport-building behaviours, which misalign with normative expectations. Additionally, their nonverbal traits are often misinterpreted as deceiving, increasing risks like false confessions. Using a virtual mock-burglary scenario, this study aims to examine how suspect status (guilty vs. innocent), self-reported rapport and cognitive load influenced nonverbal behaviour in 52 AuDHD and 50 non-AuDHD participants during investigative interviews. A moderated mediation model tested whether rapport mediated the relationship between neurodiversity status and nonverbal behaviour and whether cognitive load moderated these effects. Nonverbal behaviour duration in investigative interviews has not been previously studied, therefore this study takes an exploratory approach to investigate its role in suspect interviews. While no differences in nonverbal behaviour frequency were found, AuDHD participants exhibited longer durations of nonverbal behaviour, potentially due to self-regulation differences. This lack of difference may also be attributed to high rapport scores across the groups, as higher rapport was associated with increased nonverbal behaviour. However, rapport mediated this effect for AuDHD participants but only when cognitive load was low, suggesting that AuDHD individuals respond to rapport differently. Contrary to expectations, cognitive load did not moderate these effects. These findings underscore the importance of recognizing AuDHD individuals' unique nonverbal traits during investigative interview settings. As one of the first studies to examine nonverbal behaviour duration in investigative interviews, further research is needed to unravel the underlying mechanisms driving these behaviours.

Nonverbal Behaviour as a Cue for Vulnerability: Examining ASD and ADHD Suspects in Investigative Interviewing

Neurodiversity encompasses neurological differences such as autism spectrum disorder (ASD) and attention deficit hyperactivity disorder (ADHD) (Clouder et al., 2020). In the Netherlands, in 2023, 3.1% of men and 1.6% of women have ASD, while 5.9% of men and 3.9% of women have ADHD (CBS StatLine, 2024b). Interestingly in 2023, 1.24% of men and 0.20% of women were suspected of crimes (CBS StatLine, 2024a), suggesting that ASD and/or ADHD individuals are likely represented among them. This aligns with Anns et al. (2023), who found that ADHD is overrepresented in the criminal justice system of the United Kingdom. Given that investigative interviews are socially and cognitively demanding, ASD and/or ADHD individuals may face disproportionate risks due to additional challenges in social communication, cognitive processing, and managing high-pressure situations (Bagnall et al., 2023; Normansell-Mossa et al., 2021). Therefore, it is crucial to understand these traits to ensure fair investigative practices and providing appropriate guidance.

Autism Spectrum Disorder and Attention Deficit Hyperactivity Disorder

ASD is an umbrella term for several neurodevelopmental conditions characterized by impaired reciprocal social communication and interaction, as well as restricted and repetitive patterns in behaviour, interest, or activities (American Psychiatric Association, 2013). Additionally, individuals with ASD often experience extreme distress over slight changes and struggle with sensory processing, such as sensitivity to sounds or textures (American Psychiatric Association, 2013). Distress may also arise from difficulties in interpreting facial expressions, making eye contact, or aligning their expressions, intonation, and body with social expectations (Logos et al., 2021; Stuart et al., 2022; Volkmar et al., 2021). As a result, individuals with ASD may experience difficulties with self-regulation, which is the ability to manage their emotional, motivational, and cognitive arousal to adapt to situations (Blair &

Diamond, 2008). Challenges in self-regulation can lead to self-soothing and stress-adaptive behaviours, such as gaze aversion (avoiding eye contact), stimming (e.g., hand flapping, finger flicking, or object spinning) and face touching, strategies that help regulate sensory and emotional overload (Kapp et al., 2019; Schaaf & Lane, 2015). Behavioural ASD traits typically manifest in early childhood and evolve over time (American Psychiatric Association, 2013). Later in life, individuals may mask these traits to cope with or conceal self-regulation difficulties, adapting to societal expectations through learned strategies (Lordan et al., 2021). For instance, they may mimic the behaviours of neurotypical individuals (those without neurological differences) (Alaghband-rad et al., 2023). Such self-regulation difficulties and coping strategies are also observed in individuals with ADHD.

While ASD and ADHD both involve challenges with self-regulation, they manifest differently in social interactions. ADHD is characterized by inattention, hyperactivity, and impulsivity, which affect executive functioning or development (American Psychiatric Association, 2013). Inattention is often expressed as difficulties with maintaining attention, following instructions, forgetfulness, and avoiding mentally demanding tasks (Barkley, 1997; Flanigan, 2021). Hyperactivity, on the other hand, is marked by excessive motor activity, like fidgeting and talkativeness, while impulsiveness involves hasty, potentially harmful actions without forethought (American Psychiatric Association, 2013; Stanford & Sciberras, 2022). For instance, hyperactivity and impulsivity may lead to inappropriate behaviours, such as standing up when expected to remain seated (Stanford & Sciberras, 2022). Additionally, individuals with ADHD are easily distracted by extraneous stimuli and often struggle to maintain attention during conversations (American Psychiatric Association, 2013). Like ASD, these difficulties stem from self-regulation deficits which may overload executive functioning and result in self-soothing behaviours such as fidgeting (Barkley, 1997; Blair & Diamond,

2008). The severity of the traits associated with ASD and/or ADHD varies among individuals and depends on their environment.

While self-soothing and masking behaviours help individuals with ASD and/or ADHD navigate social interactions, they can be misinterpreted during investigative interviews. Research demonstrates that challenges in self-regulation and social communication can impair memory recall and information disclosure, potentially affecting the accuracy of statements (Bagnall et al., 2023; Gudjonsson, 2003; Gudjonsson et al., 2010). Recognizing these difficulties and adapting interview practices is essential to ensure effective communication and fair investigative practices.

The Role of Rapport and Cognitive Load in Investigative Interviewing

Investigative interviews play a crucial role in gathering crime-related information and reconstructing events. The purpose of investigative interviewing is to obtain accurate and factual information from suspects, witnesses, victims and complainants while ensuring fairness and reliability (Gudjonsson, 1994). Investigative interviews rely on rapport building and memory retrieval to gather accurate information.

Rapport is defined as a trusting and warm relationship (Abbe & Brandon, 2013). Additionally, rapport can create a comfortable environment and encourage individuals to disclose information during investigative interviews (Hoekstra & Verhoeven, 2021; Weiher et al., 2023). According to Tickle-Degnen and Rosenthal (1987), rapport is established through mutual attention and involvement, positivity and coordination, including verbal and nonverbal responses such as gaze, postural alignment, smiling, mimicry and interactional synchrony. Additionally, Tickle-Degnen & Rosenthal (1990) noted that a higher rapport score is associated with more nonverbal behaviour, as the interaction is perceived as warm, friendly, and open. Establishing rapport not only makes the suspect feel at ease but also reduces stress and encourages memory recall.

Reducing stress is necessary, especially since stress can impair memory recall, suggesting a higher cognitive load (Memon et al., 2010). Cognitive load is the amount of working memory used for processing, retrieving and verbalizing information (Sweller et al., 2011). A meta-analytic review by Deffenbacher et al. (2004) suggests that heightened stress and anxiety can impact memory recall. By reducing stress through rapport (e.g., making the suspect feel at ease), cognitive load is lowered, which can improve memory recall during investigative interviews.

Misconceptions of ASD and ADHD Traits in Investigative Interviewing

Frameworks like the PEACE model and the Investigating Scenario Model (SOM) emphasize the importance of rapport and memory recall (van Beek & Bull, 2023). However, individuals with ASD and/or ADHD face additional challenges in social interactions (American Psychiatric Association, 2013), which can hinder their ability to establish rapport and recall memory (Bagnall et al., 2023). These challenges raise questions about whether current frameworks adequately address such vulnerabilities.

Techniques outlined in *Achieving Best Evidence in Criminal Proceedings* and *Code C of PACE*, provide safeguards and guidelines for questioning vulnerable suspects (Ministry of Justice, 2022) but lack specific vulnerability identification methods (Dehaghani, 2021; Farrugia & Gabbert, 2020). This inability increases the risk of misinterpretations of behaviour, affecting the credibility of accounts and potentially leading to misleading or self-incriminating information (Gudjonsson, 2003; Gudjonsson et al., 2010). To address this inability and conform to Dutch law, which mandates the Dutch police to detect and protect vulnerable suspects, the Netherlands Police Academy developed the Vragenlijst Indicatie Kwetsbaarheid [Questionnaire Indication Vulnerability] (Ministerie van Justitie en Veiligheid, 2021). However, this tool primarily relies on verbal communication (Bouma, 2024), overlooking potential indicators in nonverbal traits (e.g., stimming, fidgeting, gaze aversion)

for identifying individuals with ASD and/or ADHD. However, the nonverbal ASD and/or ADHD traits may hinder rapport, memory recall and may can be misinterpreted as deceiving.

Rapport, Cognitive Load and ASD and ADHD Traits in Investigative Interviewing

Individuals with ASD and/or ADHD often face challenges in interpreting social cues and adapting to social expectations. While these challenges may not inherently pose problems, high-stress situations like investigative interviews can exacerbate them (Normansell-Mossa et al., 2021). Additionally, South and Rodgers (2017) identified ambiguity as a key contributor to anxiety in ASD, which can disrupt sensory processing and self-regulation. Given that investigative interviews are inherently stressful and ambiguous, they are likely to place additional strain on these processes and may lead to atypical expressions, such as laughing or smiling at inappropriate moments (Logos et al., 2021; Volkmar et al., 2021). Consequently, this may impair the flow of the interaction and hinder the cohesiveness necessary to establish mutual attentiveness (Tickle-Degnen & Rosenthal, 1987). Furthermore, self-soothing behaviours in ASD and/or ADHD (e.g., gaze aversion and stimming) (Kapp et al., 2019) may directly conflict with the Tripartite model of Rapport (Tickle-Degnen & Rosenthal, 1987), mainly due to its reliance on mutual gaze, cohesive interactions, and mimicry, elements that may be difficult to achieve in this context.

According to the Tripartite model of Rapport, a cohesive and coordinated interaction is essential to establish rapport (Tickle-Degnen & Rosenthal, 1987). However, achieving this becomes challenging when an individual with ADHD is frequently distracted or speaks out of turn due to self-regulation deficits (American Psychiatric Association, 2013; Flanigan, 2021). As a result, these difficulties may also reduce the interviewer's ability to obtain a reliable and accurate account. Therefore, in attempts to obtain an account, pressure may be increased, resulting in heightened stress and potentially triggering behaviours, such as squirming and

fidgeting (Kapp et al., 2019; Stanford & Sciberras, 2022). These behaviours may be interpreted as discomfort or evasiveness, further disrupting rapport-building.

Overall, the Tripartite model of Rapport (Tickle-Degnen & Rosenthal, 1987) appears to misalign with ASD and/or ADHD traits. Brewer et al. (2016) strengthen this, by noting that neurotypical individuals often misinterpret autistic facial expressions. Therefore, this suggests that normative rapport behaviours may fail with ASD and/or ADHD individuals. While literature extensively examined rapport and its establishment in neurotypical populations, few studies address how rapport is built with ASD and/or ADHD individuals. Notably, Crompton et al. (2020) discuss the interactions between individuals with similar and different neurotypes (ASD vs. ASD, non-ASD vs. ASD etc.), suggesting that the development of rapport differs for autistic individuals. They attribute these differences to the double empathy problem, a mutual disconnect in understanding between neurotypical and neurodivergent individuals (Milton, 2012). Although the findings of Crompton et al. (2020) are considered relevant, they are discussed outside the context of investigative interviewing. These self-soothing traits may impair rapport-building and can be perceived as deceitful.

Nonverbal Behaviours in ASD and ADHD: Traits Versus Deception Cues

Nonverbal behaviour plays a dual role in investigative contexts: it can be instrumental in establishing rapport, but it can also be misinterpreted as cues to deception. Several studies explored the increasing cognitive load as a strategy to differentiate between liars and truth-tellers based on their exhibited nonverbal cues (DePaulo et al., 2003; Frosina et al., 2018; Vrij et al., 2011). Vrij et al. (2011) suggest that lying should be more cognitively demanding, since the liar should invent a story, monitor the fabrication to stay plausible, keep track of what was said and suppress the truth. Therefore, the cognitive load of the liar should be higher compared to the truth-teller, ultimately resulting in nonverbal cues to deception (DePaulo et al., 2003). On the contrary, Vrij et al. (2011) also note that truth-tellers may experience a high

cognitive load due to nervousness. Similarly, van Beek (2020) noted that such methods for detecting deception based on nonverbal cues (e.g., gaze aversion, facial expressions, fidgeting and stimming) gained popularity but lack scientific validation.

These deception detection methods pose challenges for individuals with ASD and/or ADHD, whose nonverbal traits overlap. For instance, DePaulo et al. (2003) examined the differences between liars and truth-tellers and their attempts to control their behaviours, finding that liars often avoid eye contact when they are motivated to deceive. Additionally, they also note that such cues may stem from other factors unrelated to deception. This tendency to avoid eye contact is particularly problematic when assessing ASD individuals, as this self-soothing trait of ASD can be interpreted as deceiving (Stuart et al., 2022). Similarly, Jacobs (2022) highlights the lack of training provided to police on neurodiversity, noting that behavioural traits associated with ASD and/or ADHD, such as inattention and hyperactivity, are frequently misinterpreted as signs of guilt or deception. Furthermore, Gudjonsson et al. (2010) found that ADHD symptoms of inattention and hyperactivity were significantly higher among false confessors. Additionally, Gudjonsson et al. (2008) note that individuals with ADHD may exhibit higher levels of compliance. The tendency to comply with authority figures, and misinterpretation of ADHD traits, combined with difficulties in self-regulation and impulsivity increases the risk of false confessions. Bagnall et al. (2023) studied the effects of autistic and non-autistic adults in a virtual burglary scenario, finding that autistic mock suspects were perceived as more deceiving and less credible than non-autistics based on their verbal and nonverbal behaviour. These findings suggest that ASD/ADHD traits (e.g., gaze aversion, attention deficits, fidgeting and stimming) may be misattributed to deception, increasing the risk of false confessions.

Present Study

While existing research has explored the role of rapport, cognitive load and nonverbal behaviours in investigative interviews, few studies examine these factors in individuals with ASD and/or ADHD (hereafter AuDHD). Recognizing unique nonverbal AuDHD traits may improve early detection and reduce misinterpretations during interviews. By improving interviewers' understanding of these traits, investigative practices can be adapted to ensure fairer and more reliable outcomes. The overarching goal of this study is to increase awareness for identifying AuDHD suspects. This study aims to examine how suspect status (guilty vs. innocent) affects nonverbal behaviour in AuDHD and non-AuDHD individuals during investigative interviews. The research question is formulated:

> *To what extent do AuDHD and non-AuDHD individuals, guilty or innocent, differ in nonverbal behaviour during investigative interviewing?*

Based on the literature, the following hypotheses are proposed:

H1a: AuDHD participants will exhibit more nonverbal behaviour during an investigative interview than non-AuDHD participants.

H1b: Guilty AuDHD participants will exhibit more nonverbal behaviour during an investigative interview than innocent AuDHD participants.

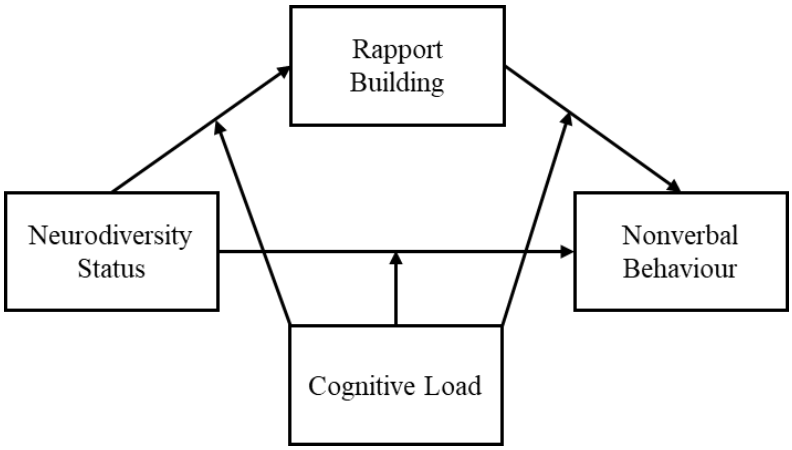
H2: AuDHD participants will exhibit more nonverbal behaviour during an investigative interview than non-AuDHD participants, with rapport mediating and cognitive load moderating this relationship.

The hypotheses are grounded in the expectation that individuals with AuDHD will exhibit more nonverbal behaviour under stressful situations (e.g., as self-soothing), with rapport mediating and cognitive load moderating this relationship, as illustrated in Figure 1. Rapport is expected to mediate the relationship since normative rapport behaviours are found to misalign with the social communication styles of AuDHD individuals. Therefore, it is expected that AuDHD participants perceive lower rapport compared to non-AuDHD

participants. Cognitive load is expected to moderate the relationship, with higher cognitive load amplifying the difference in nonverbal behaviour between AuDHD and non-AuDHD participants. Therefore, further impairing rapport-building and reinforcing self-soothing and stress-adaptive behaviours.

Figure 1

Schematic Representation of the Moderated Mediation Model



Method

Design

A 2 (Neurodiversity Status: non-AuDHD vs. AuDHD) x 2 (Suspect Status: guilty vs. innocent) between-subjects design examined participants' nonverbal behaviour, perceived rapport, and cognitive load during investigative interviews. To simulate a realistic investigative setting, participants engaged in a virtual mock-burglary scenario to establish guilty or innocent roles before the interview. Prior to data collection, ethical approval was obtained from the University of Twente (request – 240950).

Participants

In total, 102 participants (53 male and 49 female), aged 18 to 30 (M = 23.30 years, SD = 2.52), were recruited through snowball, convenience, and volunteer sampling via peer referrals, University of Twente campus advertisement, social media platforms (e.g., Discord and WhatsApp), and the Sona System (1.25-credit incentive for University of Twente

Students). Inclusion criteria required participants to be at least 18 years old with proficient English skills. No participants were excluded based on these criteria. However, video data for five participants was unavailable due to data corruption and recording issues.

The sample included 14 nationalities, with the majority, 70%, being Dutch (n = 71), followed by German (12%, n = 13), and 18% (n = 18) representing other or dual nationalities. Participants' highest level of education varied, with 66 (65%) having completed Higher Professional or University Education, 34 (33%) having completed High School and two (2%) having completed Secondary Vocational Education.

Participants were divided into four groups based on suspect status (guilty, n = 53 or innocent, n = 49), and neurodiversity status (AuDHD, n = 52 or non-AuDHD, n = 50), see Table 1 for the four distinct groups by gender. In terms of neurodiversity, 19 participants (19%) reported a professional diagnosis, including AD(H)D (n = 8), ASD (n = 3), and other conditions (n = 14). Additionally, 10 participants (10%) suspected they had an undiagnosed condition, while 82 participants (81%) reported no diagnosis, and one preferred not to disclose this information. Participants without a formal ASD and/or ADHD diagnosis (n = 91) completed the Autism Quotient (AQ-10; Baron-Cohen et al., 2001) and ADHD self-report scale screener (ASRS v1.1; Kessler et al., 2005). Based on these measures, 36 were classified into the ADHD group, 13 into the ASD group, and eight scored positive for both screeners.

Table 1

Overview of Distribution for Neurodiversity Status, Suspect Status and Gender (N = 102)

	AuDHD (n = 52)		Non-AuDHD (n = 50)	
	n	%	*n*	%
Guilty (n = 53)	27	52	26	52
Female	12	23	14	27
Male	15	29	12	23

Innocent (n = 49)	25	48	24	48
Female	12	23	11	22
Male	13	25	13	26

Materials

Allocation of Suspect Status

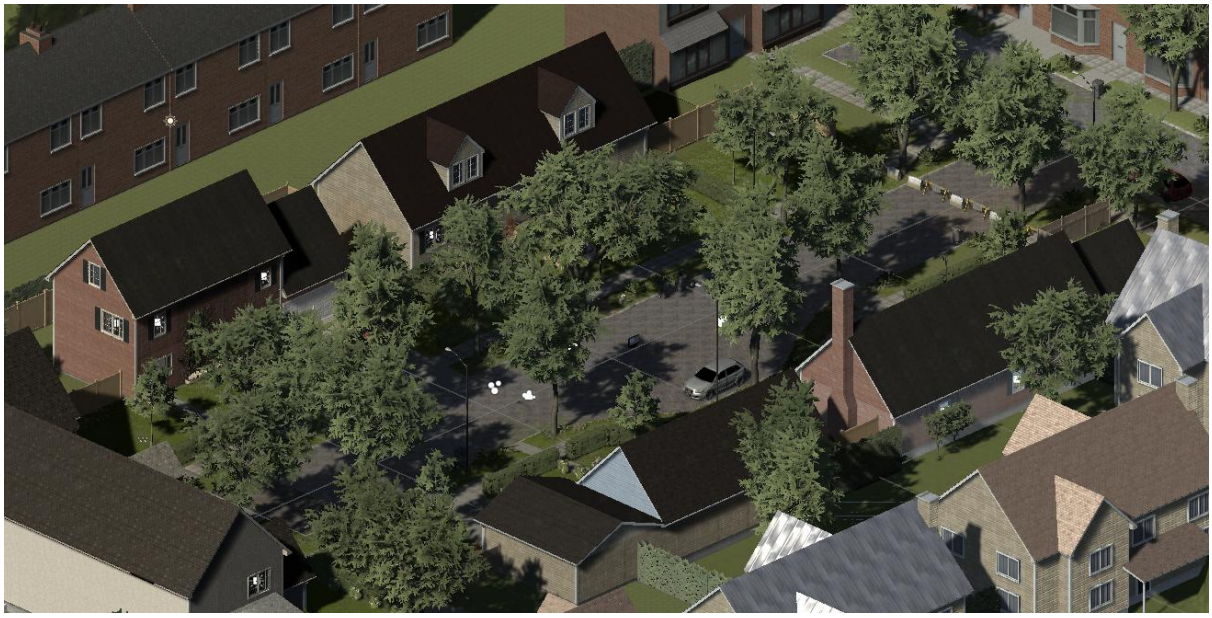
Suspect status (guilty or innocent) was assigned via block randomization. The first 34 participants received the guilty condition, after which subsequent participants were randomly allocated. Each condition corresponded to a case vignette, described in Appendix B, providing a background story to establish guilt or innocence.

Virtual Environment: Neighbourhood and House

The Virtual Reality (VR) environment consisted of a pre-designed Dutch suburban neighbourhood created in Unity 2021.3.32f1 and obtained from van Sintemaartensdijk (see Griemink, 2023). Participants experienced the environment using a Meta Quest 2 head-mounted display with a stereoscopic view and two handheld controllers, allowing them to freely navigate and view the environment (van Sintemaartensdijk et al., 2020). The neighbourhood was designed to simulate a realistic burglary scenario while ensuring experimental control and ethical feasibility. All participants explored the same environment, starting from a pre-defined location. The neighbourhood consisted of a single street bordered by trees, with parked cars, and roadblocks at one end, as shown in Figure 2.

Figure 2

A Bird's Eye View of a Neighbourhood



One house was accessible as the scouting process and act of burglary fell outside the scope of this research. This house, as shown in Figure 3, was on ground-level structure including an office, storage room, bedroom, bathroom, and combined kitchen and living room.

Figure 3

Front View of the House

To familiarize guilty participants with the VR controls and item manipulation, three practice items were placed on the street: a television and two chandeliers. A white box was provided for participants to practice depositing items, see Figure 4.

Figure 4

Street View: White Box, Television, and Chandeliers as Practice Items

The duration of time spent in the environment was recorded, along with their location data within the VR simulation using an integrated GPS tracker. Additionally, screen and sound recordings of the VR sessions were made using OBS Studio (version 30.2.2). While duration, location and the recordings were collected, they fell outside the scope of this study but may be useful for future research.

Investigative interview

The investigative interviews were conducted by a single interviewer, referred to as a 'police officer'. To minimize potential bias, as familiarity with the participant can impact the interview and perceived rapport, two researchers alternated in this role throughout the study. The interviews were recorded using a GoPro Hero 9 camera. Two rooms were used to conduct the interview, a smaller and larger room both containing a table and chairs. In the smaller room, a camera was positioned to capture a front-facing angle of the participant and a profile view of the interviewer, see Appendix C Figure 5. In the larger room, the camera was

set up to capture a side view of the interaction, see Appendix C Figure 6. This set-up in the larger room enabled the recording of mimicry between the interviewer and participant, as mimicry is considered a nonverbal cue associated with rapport (Grahe & Bernieri, 1999; Weiher et al., 2020). Although mimicry behaviours fell outside the scope of this study, the recordings may be useful for future research.

Both guilty and innocent participants received the same set of structured interview questions. A structured interview script, see Appendix D, was developed based on the investigative interview method used in the Netherlands, which follows a three-stage structure: opening the interview, person-oriented interview, and case-oriented interview (Hoekendijk & Beek, 2015; Rispens & van der Sleen, 2022). Additionally, studies that used a structured investigative interview (Saciri, 2024; Weiher et al., 2020) were consulted to design the structure and formulation of the script. The specific interview questions were developed based on the Dutch method and were refined based on feedback from supervisors. The script utilized a funnel structure, beginning with broad, open-ended questions and gradually narrowing it down to specific case-related questions, to encourage cooperation and rapport.

Questionnaires: Demographics, Screeners and Self-Reported

Descriptive statistics for these measures are reported in the Results section.

Presence and Cybersickness. Following the virtual environment task, participants completed two self-report questionnaires to assess spatial awareness and cybersickness in the environment, described in Appendix E, adapted from van Sintemaartensdijk et al. (2020). Both questionnaires consisted of items related on a 5-point Likert scale ranging from *Strongly Disagree* to *Strongly Agree*. Spatial awareness included seven items, such as “I felt I could be active in the virtual environment”, and the cybersickness scale included five items, for example, “The environment made me dizzy”. These measures were not analysed in this study as they fell beyond the scope but were collected for future research.

Screening ASD and ADHD. To differentiate participants with and without AuDHD, two validated screening tools were administered to participants without an official diagnosis of ASD and/or ADHD. The Autism Quotient (AQ-10; Baron-Cohen et al., 2001), see Appendix F, is a 10-item, 4-point Likert scale derived from the 50-item Autism Spectrum Quotient and designed to screen for ASD in adults without learning disabilities (Allison et al., 2012; Baron-Cohen et al., 2001; National Institute for Health and Care Excellence, 2021). Therefore, AQ-10 was selected for its brevity and suitability for screening adults for ASD (National Institute for Health and Care Excellence., 2021). Each statement (e.g., "I often notice small sounds when others do not") was scored 1 point when participants responded *Definitely* or *Slightly Agree* for statements.

The ADHD self-report scale screener (ASRS v1.1; Kessler et al., 2005), see Appendix G, is a 6-item, 5-point Likert scale derived from the 18 DSM-IV criteria for screening symptoms of ADHD (American Psychiatric Association, 2013; Kessler et al., 2005). The ASRS v1.1 was selected for its brevity, as the 6-items were perceived as the most predictive for the disorder (Adler et al., n.d.). Each statement (e.g., "How often do you have problems remembering appointments or obligations?") was scored 1 point if participants responded *Sometimes*, *Often* or *Always* for statements.

Self-Reported Rapport. Participants' perceived rapport was assessed using two questionnaires, the Rapport scales for Investigative Interviews and Interrogations (RS3i; (Duke et al., 2018) and an interaction scale (Bernieri, 1988), see Appendix H. The RS3i interviewee version consists of a 21-item, 5-point Likert scale based on the Tripartite Model of Rapport (Tickle-Degnen & Rosenthal, 1987), with modifications to fit this study (e.g., *Interviewer* was changed to *police officer*). The internal consistency of the scale, assessed using Cronbach's alpha, demonstrated strong internal consistency, with a Cronbach's Alpha of .87. The RS3i interviewee version includes additional subscales such as Attentiveness,

Trust/Respect, Expertise, Cultural Similarity, Connected Flow and Commitment to Communication. Example items included, “I think the police officer was generally honest with me” and “The police officer and me probably share the same ethnicity”, with answering options ranging from *Strongly Disagree* to *Strongly Agree*. The subscale Cultural Similarity was deemed as supplementary to measure rapport.

In contrast, the interaction scale of Bernieri (1988) consists of a 7-item, 5-point Likert scale, which aligns with the Tripartite model, comprising its three essential components: Coordination, Positivity and Mutual Attentiveness (Tickle-Degnen & Rosenthal., 1987). Example items included, “The interaction seemed …well-coordinated,” with answering options ranging from *Strongly Disagree* to *Strongly Agree*. The internal consistency of the rapport scale was assessed using Cronbach's alpha. The scale demonstrated good reliability, with a Cronbach's alpha of .81. Due to its focus on the three core components of the Tripartite Model and both being dependable related to internal consistency, the interaction scale is considered more aligned compared to the RS3i interviewee version. However, both scales were used for this study, the interaction Bernieri scale was used to analyse the data.

Self-Reported Cognitive Load. To measure participants cognitive load prior to and during the investigative interview, a scale created by a peer with a Cronbach’s Alpha of .82 (see, Herrema, 2025), based on the studies of Shenhav et al. (2017) and Vogels et al. (2014) was used. The cognitive load scale consists of a 11-item, 5-point Likert scale, measuring the ability to verbalize thought processes and memory retrieval during the investigative interview, see Appendix I. Example items included “I found it difficult to explain the order of events while being interviewed” and “I seemed to forgot what I already told the police officer and what I did not” with answering options ranging from *Strongly Disagree* to *Strongly Agree.* This study found a Cronbach’s alpha of .86, demonstrating high internal consistency.

Motivation and Willingness to return. Participants' motivation and attention were assessed using two self-reported items on five-point Likert Scale, along with an open-ended question asking guilty participants to recall the practice items in the virtual environment. Additionally, participants' willingness to return for a follow-up interview and preference for legal representation were measured using two dichotomous (yes/no) questions. Willingness to return measures were included for exploratory purposes but fell outside the scope.

Procedure

Task Explanation

Prior to participation, minimal information was provided to participants to preserve the spontaneity of their responses. Upon arrival, participants were welcomed and informed that the study involved a VR task, questions about the VR experience, and several questionnaires. The computer in the lab was set up with Qualtrics for the informed consent and the questionnaires. The researcher assigned a participant number to the participant, after which participants read the informed consent and provided consent by checking "Yes" in the designated checkbox. Following consent, participants received a case vignette containing their suspect condition, either they were visiting an open-house event and searched for a realtor or were instructed to burglarize a house.

Virtual Reality Task and Post-Experience Evaluation

Following the allocation of suspect condition, participants were then familiarized with the Meta Quest 2 VR headset and handheld controllers. Guilty participants received additional instructions for 'stealing' items with the controllers, by placing them in or near white boxes located in each room. Moreover, to get acquainted with the Meta Quest 2 controllers and stealing items, guilty participants were informed about a practice task before burglarizing the house. Following the task explanation and instructions on the VR headset and handheld controllers, participants put on the VR headset.

The researcher assisted participants in adjusting the VR headset for a comfortable fit and handed the participants the two handheld controllers. In the VR environment, participants faced the street and houses. Innocent participants were reminded to search for the open house and entered once located. Inside, they could explore various rooms to look for the realtor. If they determined no one was present, they were informed they could either stay and wait for the realtor or leave the house, which ended the VR simulation. Guilty participants were reminded of the practice task, in which they had to place the three items on the street (illustrated in Materials, Figure 4) into a designated white box. Following the practice task, participants entered the house, burglarized the house and ended the simulation by leaving once they believed the task was complete.

After completing the mock-burglary scenario, participants returned to the computer to complete two self-report questionnaires assessing spatial awareness and cybersickness in the environment (van Sintemaartensdijk et al., 2020; see Materials). Upon finishing these questionnaires, participants focused their attention to the researcher.

Investigative interview

After the mock-burglary and post-task questionnaires, participants were taken to the interview room. During the walk, the researcher informed participants that they were considered suspects of a burglary in a neighbourhood and were instructed to convince their innocence. In the interview room, participants were asked to sit across the police officer, who followed a structured interview script, see Appendix D. The interview began when the researcher pressed the record button on the GoPro Hero 9 camera, stated the participant number, and exited the room.

The police officer started the conversation according to the interview script, with an an opening phase, explaining legal and procedural rules, such as, “For your protection and mine I will record this, so we get a full account of what was said today”. This was followed

by person-oriented questions to establish rapport, including, “Do you have a job” and follow-up questions like, “How long have you worked there, and what are your main tasks?”. After the person-oriented questions the police officer reminded the participant that they are considered a suspect of a burglary and focused more on details of the case, such as “Please tell me in as much detail as possible, why you were in the neighbourhood?”. Followed by targeted questions like, “Can you explain why you entered the house?”. The interview concluded with the police officer thanking the participants for their time and information, after which the researcher re-entered the room.

Questionnaires

After completion of the interview, participants were guided to the first room to complete additional questionnaires. These questionnaires included measures of demographic information, neurodiversity status, self-reported rapport, self-reported cognitive load, motivation and willingness to return. Participants without a diagnosis of ASD and/or AD(H)D answered the AQ-10 and ASRS v1.1. Participants with ASD and/or AD(H)D were not administered these screeners. Upon completion of the questionnaires, participants were debriefed, thanked for their participation, invited to ask questions, and encouraged to share the study with others.

Data Analysis

The data was analysed using R version 4.4.2, with packages “car, effectsize, Hmisc, Lavaan, Mediation, psych, readxl and tidyverse”. The data sample is assessed for adherence to the assumptions of normality and homogeneity of variances. When significant results are found, and the assumptions are not met, the data will be adjusted to meet the assumptions. Several two-way ANOVA measures compared neurodiversity status (AuDHD vs. non-AuDHD) and suspect status (guilty vs. innocent) with the continuous variables: self-reported rapport, cognitive load and nonverbal behaviour. If significant results are observed, post-hoc

analysis will be conducted. Moreover, independent sample t-test will be performed to assess the differences between guilty AuDHD and innocent AuDHD participants. Additionally, when a significant result found, a Cohen's d was performed to assess the strength of the significant effect.

Behavioural data: Nonverbal Behaviour

Recordings of the investigate interview were examined for nonverbal behaviour using Behavioral Observation Research Interactive Software version 8.27.10 (BORIS). BORIS is a free, open-source event-logging software designed for video/audio coding and live observations, developed for animal behaviour research (Friard & Gamba, 2016). The adaptability of the programme makes it suitable for analysing human nonverbal behaviour in this experimental context. To achieve this, predefined nonverbal behaviours were created in a coding scheme, following the BORIS user guide v.9 (Friard & Gamba, 2016).

Nonverbal Behaviour Coding. A predefined coding scheme, described in Appendix K, was developed to systematically analyse five key nonverbal behaviours associated with AuDHD individuals: Body Activity, Fidgeting, Gaze Aversion, Stimming and Unexpected Facial Expressions (American Psychiatric Association, 2013). Interview recordings were coded in BORIS, with coding intervals from the officer's opening "Hello, I would like to…" to closing statement "You can wait here…" based on the interview script. The coding focused on duration-based state events, capturing the start and end of the behaviour observed (e.g., Fidgeting from 01:48,333 to 01:52,435). While modifiers such as 'object interaction' were included for fidgeting, others (e.g., nodding or shaking, blinking and excessive blinking) were excluded as they were not observed, or were found during comprehension checks and deemed non-diagnostic or showed limited relevance to target behaviours. Coded events were exported as duration-aggregated data (XLSX) for analysis. This approach allowed frequency counts and duration calculations of the observed nonverbal behaviours.

Analysing Nonverbal Behaviours. Even though several nonverbal behaviours associate with nonverbal AuDHD traits, this study focuses are in two-fold. First it focuses on the overall nonverbal behaviour comprising four key nonverbal behaviours, Fidgeting, Gaze Aversion, Stimming and Unexpected Facial Expressions. Body Activity is not included for the analysis due to its limited relevance to the target behaviours. Second, the study analyses the two most associated nonverbal behaviours in AuDHD individuals separately, namely gaze aversion and fidgeting. As these behaviours are found to be the most indicating of AuDHD (American Psychiatric Association, 2013). Therefore, the other behaviours (Body activity, Stimming and Unexpected Facial Expressions) are not separately analysed, but may be useful for future studies. The observed events are standardized allowing comparison of nonverbal behaviour, by dividing the observed frequency by the total duration of the interview recording. Moreover, duration of nonverbal behaviour is explored with a two-way ANOVA, due to lack of prior literature.

Exploring the effects of the Moderated Mediation model

The moderated-mediation model, see Present Study Figure 1, was assesses by a moderated mediation test, following the guidelines provided by Washburn (n.d). In this test, rapport is as mediator and cognitive load a moderator. Two regression models, one looking at the effects of neurodiversity status, cognitive load and their interaction on rapport, and one looking at the effects of neurodiversity status, cognitive load and rapport on nonverbal behaviour were created. Next, the influence of cognitive load (moderating variable) on the mediation effect of neurodiversity status on nonverbal behaviour through rapport were assessed. This allowed us to examine the mediation effect for those with a low cognitive load score and with a high cognitive load score. Lastly, it is assessed whether there is a difference at each level of the cognitive load score.

Results

Descriptive Statistics

The investigative interviews took an average of 6 min and 35 s (*SD* = 1 min and 48 s, *minimum* = 3 min and 50 s, *maximum* = 11 min and 48 s).[1] No significant differences were perceived in length of interview for neurodiversity status ($F(1, 93) = 2.48$, $p = .12$) and suspect status ($F(1, 93) = 1.48$, $p = .23$), nor the interaction ((1, 93) = 0.16, $p = .69$). The means and standard deviation of the dependent variables are shown in Table 2 per group.

Table 2

Means and Standard Deviations of Dependent Variables

	Au-DHD (*n*=50)		Non-AuDHD (*n*=47)		Guilty (*n*=48)		Innocent (*n*=49)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Rapport	3.93	0.62	4.13	0.55	4.04	0.61	4.02	0.58
Cognitive Load	2.50	0.77	2.47	0.73	2.71	0.70	2.27	0.73
Nonverbal Behaviour	0.21	0.16	0.23	0.13	0.19	0.09	0.25	0.16
Gaze Aversion	0.15	0.13	0.17	0.12	0.13	0.08	0.19	0.15
Fidgeting	0.03	0.02	0.04	0.03	0.03	0.03	0.03	0.03
Nonverbal Behaviour*	279	180	211	126	268	165	224	153
Gaze Aversion *	120	87	91	60	115	82	97	69
Fidgeting *	84	72	85	80	84	77	86	76

Note. *n* = 97. Rapport and Cognitive Load were measured on a 5-point Likert scale. *The duration of Nonverbal Behaviour, Gaze Aversion and Fidgeting are exploratory and is in seconds.

Correlation Between the Dependent Variables

The strength and direction of the dependent variables are shown in the correlation matrix in Table 3. There was a strong and significant correlation between frequency of

[1] The duration of the interviews is similar and centralized across the groups (Neurodiversity status x Suspect status). The mean duration of these groups is between 05:58 minutes and 06:30 minutes.

nonverbal behaviour and gaze aversion (r = .99, p = < .001). This implied that individuals who exhibit more nonverbal behaviours tend to demonstrate more gaze aversion. Moreover, strong correlations between total frequency of nonverbal behaviours and the duration of nonverbal behaviours, duration of gaze aversion and duration of fidgeting were observed. However, all these correlations indicated that participants who exhibited more nonverbal behaviour, the duration of the behaviour tends to be shorter. Conversely, participants who exhibited fewer nonverbal behaviours, tend to spend more time on each behaviour. A similar effect is found for frequency of gaze aversion on the duration.

Table 3

Mean, Standard Deviation and Pearson Correlation Matrix for Dependent Variables

	M	*SD*	1	2	3	4	5	6	7	8
1. Rapport	4.03	0.59	-							
2. Cognitive Load	2.49	0.75	-.49	-						
3. NVB	0.22	0.13	.41	-.34	-					
4. Gaze Aversion	0.16	0.12	.42	-.36	.99[c]	-				
5. Fidgeting	0.03	0.03	.04	.02	.25	.14	-			
6. NVB*	246	159	-.40	.23	-.94[c]	-.90[b]	-.53	-		
7. Gaze Aversion*	106	76	-.36	.06	-.80[a]	-.74[a]	-.70	.95[c]	-	
8. Fidgeting*	85	76	-.29	.39	-.89[b]	-.91[b]	.03	.73[a]	.49	-

Note. n = 97. [a]p < .05, [b]p <0.01, [c]p <0.001. NVB: frequency of Nonverbal Behaviour. *Out of interest and as exploratory study, duration of Nonverbal Behaviour, Gaze Aversion and Fidgeting were included in the correlation matrix.

The effects of Neurodiversity Status and Suspect Status on Nonverbal Behaviour

To test Hypotheses 1a, three two-way ANOVAs were conducted to assess the effects of neurodiversity status (AuDHD vs. non-AuDHD) and suspect status (guilty vs. innocent) on total frequency of nonverbal behaviours, fidgeting and gaze aversion, see Table 4. Additionally, to test Hypothesis 1b, whether guilty AuDHD participants exhibit more

nonverbal behaviour during investigative interviews than innocent AuDHD participants, independent sample-t tests were conducted for total frequency of nonverbal behaviours, fidgeting and gaze aversion.

Table 4

Two-Way ANOVAs for the Independent and Dependent Variables on Nonverbal Behaviours

Independent Variables	Dependent Variables		
	Total Frequency of Nonverbal Behaviour		
	F (1,93)	*p*-value	η^2
Neurodiversity Status	0.99	.32	.01
Suspect Status	3.77	.06[a]	.04
Interaction Effect	1.52	.22	.02
	Nonverbal Behaviour: Gaze Aversion		
	F (1,93)	*p*-value	η^2
Neurodiversity Status	0.32	.57	<0.001
Suspect Status	4.76	.03[b]	.05
Interaction Effect	0.64	.43	<0.001
	Nonverbal Behaviour: Fidgeting		
	F (1,93)	*p*-value	η^2
Neurodiversity Status	0.68	.41	<0.001
Suspect Status	0.60	.44	<0.001
Interaction Effect	0.45	.51	<0.001

Note. [a]$p < .10$, [b]$p < .05$.

Total Frequency of Nonverbal Behaviour

A two-way ANOVA (Table 4) revealed no significant main or interaction effects for total nonverbal behaviour, suggesting that neurodiversity status did not affect the total frequency of nonverbal behaviour. However, suspect status for total frequency of nonverbal behaviour showed a near significant trend ($p = .06$). Follow-up tests revealed a higher total frequency of nonverbal behaviour in AuDHD innocent versus AuDHD guilty ($p = .12$) but

was found nonsignificant. Moreover, violations of normality and outliers were observed yet removal and nonparametric tests did not alter the significance of the results.[2] Additionally, an independent sample t-test, assessed Hypothesis 1b, revealed a statistically significant effect for total frequency of nonverbal behaviour, with AuDHD guilty (M = 0.17, SD = 0.09) showed less nonverbal behaviour than AuDHD innocent (M = 0.25, SD = 0.16) participants, $t(48) = -2.25$, $p = .03$, 95% CI [-0.15, -0.01]. These results revealed that guilty AuDHD exhibit lower levels of nonverbal behaviour compared to innocent AuDHD participants, with a moderate to large effect size (d = -.64, 95% CI [-1.20, -0.06]). However, these findings were not observed for non-AuDHD participants, $t(45) = -0.47$, $p = .64$, 95% CI [-0.09, 0.06].

Gaze Aversion

Table 4 revealed that innocent displayed significantly more gaze aversion than guilty participants. No other main or interaction effects were found significant, suggesting that neurodiversity status did not affect the exhibited frequency of gaze aversion. Suspect status was found statistically significant, indicating that innocent participants exhibited more often gaze aversion than guilty participants did. Due to non-normality and outliers, a two-way ANOVA without outliers was conducted and altered the significance of suspect status, $F(1, 93) = 1.62$, $p = .21$, $\eta^2 = .02$, but not for the other main or interaction effects. Follow-up test revealed that gaze aversion is exhibited marginally more by AuDHD innocent compared to AuDHD guilty but was deemed non-significant ($p = .15$). Moreover, an independent sample t-test revealed that innocent AuDHD (M = 0.19, SD = 0.15) exhibited more gaze aversion compared to guilty AuDHD (M = 0.12, SD = 0.08), $t(48) = -2.13$, $p = .04$, 95% CI [-0.14, -0.004]. However, this significance was not found for non-AuDHD participants, $t(45) = -0.94$, $p = .35$, 95% CI [-0.11, 0.04].

[2] Total frequency of nonverbal behaviour, outlier removal and non-parametric test were explored, see Appendix M, results remained unchanged.

Fidgeting

No main nor interaction effects for fidgeting were found, as described in Table 4. Additionally, for Hypothesis 1b, the independent sample t-test did not find a statistical significance between AuDHD innocent and AuDHD guilty, $t(48) = -1.19$, $p = .24$.

Overall, these findings revealed that suspect status had a marginal effect on total frequency of nonverbal behaviour, though follow-up tests did not find significance. Innocent participants exhibited significantly more gaze aversion than guilty participants. Additionally, innocent AuDHD participants exhibited more often nonverbal behaviour and gaze aversion than innocent AuDHD participants, but this was not found for non-AuDHD participants. Fidgeting was found to be consistent across neurodiversity status and suspect status.

Exploring Duration of Nonverbal Behaviour

Duration of nonverbal behaviour was measured as part of an exploratory study. A two-way ANOVA was conducted to assess the effects of neurodiversity status (AuDHD vs. non-AuDHD) and suspect status (guilty vs. innocent) on duration of nonverbal behaviour. A statistically significant difference was found for neurodiversity status $F(1,93) = 4.55$, $p = .04$, $\eta^2 = .05$. Indicating that AuDHD participants exhibited significantly longer durations of nonverbal behaviour than non-AuDHD participants. No statistically significant difference was found for suspect status, $F(1,93) = 1.77$, $p = .19$, $\eta^2 = .02$, nor the interaction effect, $F(1,93) = 0.19$, $p = .67$, $\eta^2 = <0.01$. Follow-up tests did not find statistically significant differences between the groups (all $p > .05$). Full analysis of the exploratory study on duration of nonverbal behaviour are described in Appendix L.

Overall, these findings partially support Hypothesis 1a, as these results indicated that AuDHD participants exhibited longer durations of nonverbal behaviour. On the other hand, non-AuDHD and innocent participants demonstrated nonverbal behaviour more frequently, see Table 2, but were not statistically significant. Additionally, Hypothesis 1b was not

supported, as guilty AuDHD participants exhibited less total frequency of nonverbal behaviour and gaze aversion than innocent AuDHD participants.

Assessing the Moderated Mediation Model: Impacting Nonverbal Behaviour

The Moderated Mediation Model, see Figure 1 in Present Study, was analysed to assess the effects of rapport and cognitive load on the main interaction neurodiversity status and nonverbal behaviour. Rapport and cognitive load were analysed (see Appendices N and O, $N = 102$) but not discussed further here. To assess moderated mediation, following the guidelines of Washburn (n.d.), we first tested two regressions models followed by examining the mediation effects at low and high cognitive load.

A first regression model was conducted to estimate the effects of neurodiversity status, cognitive load, and their interaction on rapport. No statistically significant effect was found for neither neurodiversity status, $t(93) = -1.67$ $p = .10$, nor for cognitive load $t(93) = -1.07$, $p = .29$ on rapport. Similarly, no interaction effect between neurodiversity status and cognitive load was found, $t(93) = 0.64$, $p = .52$. Moreover, the model explained minimal variance in rapport and was nonsignificant, $R^2 = .001$, $F(3, 93) = 1.36$, $p = .26$. The second regression analysis was conducted to estimate the effects of neurodiversity status, cognitive load and rapport on nonverbal behaviour. The results revealed a significant main effect of rapport on nonverbal behaviour ($\beta = .24$), indicating higher rapport score was associated with increased nonverbal behaviour, $t(92) = 2.32$ $p = .03$. Neither for cognitive load, $t(92) = -0.35$ $p = .73$, nor neurodiversity status, $t(92) = -0.57$ $p = .57$, and their interaction, $t(92) = 0.30$ $p = .76$, were statistically significant. Moreover, the model explained a small proportion of the variance in nonverbal behaviour, but was found not statistically significant $R^2 = .03$, $F(4, 92) = 1.68$, $p = .16$.

The influence of cognitive load on the mediation effect of neurodiversity status on nonverbal behaviour through rapport was assessed. First it was assessed how low cognitive

load scores affected this (in)direct mediation effect. A significant Average Causal Mediation Effect (ACME; total effect – direct effect) was found at low cognitive load (ACME= -.11, p = <0.001, 95% CI [-0.37, -0.06]), suggesting that AuDHD participants exhibit less often nonverbal behaviour due to reduced rapport. However, no statistically significant Average Direct Effect (ADE; total effect – indirect effect) was found (ADE = -.18, p = .4, 95% CI [-0.62, 0.01]). Additionally, a statistically significant Total Effect (ADE + ACME = -.29, p = <0.001, 95% CI [-0.68, -0.09]), and Proportion Mediated effect (ACME/total effect= .39, p = <0.001, 95% CI [0.12, 1.95]) were found. Suggesting that a substantial proportion of the relationship between neurodiversity status and nonverbal behaviour is mediated by rapport. Second, it was assessed how high cognitive load scores affected the (in)direct mediation effect. No statistically significant indirect effect (ACME = -.05, p = .4, 95% CI [-0.17, 0.12]), direct effect (ADE = -.06, p = .4, 95% [-0.45, 0.36]), Total Effect (-.11, p = .6, 95% CI [-0.50, 0.34]), nor Proportion Mediated (.47, p = .2, 95% CI [0.02, 1.44]) was found for neurodiversity status on nonverbal behaviour through rapport. At high cognitive load, rapport did not mediate the relationship between neurodiversity status and nonverbal behaviour.

Moreover, the difference between the indirect effects at each cognitive load score were examined. The analyses showed that neither the mediation effect (ACME = -.06, p = .6, 95% CI [-0.36, 0.28]), nor the direct effect (ADE = -.12, p = .6, 95% CI [-0.81, 0.34]), significantly differ in cognitive load scores, suggesting that cognitive load does not moderate the (in)direct effects of neurodiversity status on nonverbal behaviour through rapport.

Overall, rapport had a significant main effect on nonverbal behaviour, with higher rapport associated with more nonverbal behaviour. Despite this significance, the model only explained a small proportion of variance, therefore suggesting that other factors could have contributed to the exhibiting of nonverbal behaviour. At low cognitive load, rapport mediated the neurodiversity - nonverbal behaviour relationship, but this mediation was not present at

high cognitive load. The difference between these indirect effects was found nonsignificant, indicating no statistical support for cognitive load as moderator. Therefore, hypothesis 2 was partially supported, where rapport mediated the relationship only at low cognitive load, but cognitive load did not statistically moderate the effect.

Discussion

This study experimentally assessed how guilt and innocence influence nonverbal behaviour discrepancies in individuals with and without AuDHD during investigative interviews. Contrary to expectations, no significant differences emerged in the total frequency of nonverbal behaviours between AuDHD and non-AuDHD participants. However, guilty participants exhibited less gaze aversion than innocent participants, and guilty AuDHD participants exhibited fewer nonverbal behaviours than innocent AuDHD participants. Notably, AuDHD participants showed reduced nonverbal behaviours only when rapport scores were low and cognitive load was minimal. Although AuDHD participants exhibited longer-lasting nonverbal behaviours than non-AuDHD participants, guilt or innocence did not affect nonverbal behaviour duration.

Interpreting Nonverbal Behaviour Differences in AuDHD and non-AuDHD

It was hypothesized that AuDHD participants would exhibit more nonverbal behaviour than non-AuDHD participants during investigative interviews. This hypothesis was partially supported: while no difference in frequency of nonverbal behaviour was observed, AuDHD participants exhibited longer durations of nonverbal behaviours. This aligns with the correlation observed, less frequent nonverbal behaviours tended to be longer in duration. To our knowledge, the duration of nonverbal behaviours in investigative interviews has not been previously studied. Therefore, the findings are discussed in the context of gaze aversion.

Although gaze aversion duration was similar across groups, the underlying reasons to avert gaze may differ between AuDHD and non-AuDHD. Glenberg et al. (1998) studied gaze

aversion in experimental settings and found that individuals avert gaze during memory retrieval and processing. They speculated that gaze aversion facilitates memory recall, particularly in response to challenging questions. Interestingly, in this study it was observed that participants often averted gaze aversions immediately after a question was posed and then refocused on the interviewer to respond. However, for AuDHD individuals, gaze aversion may serve as a self-regulating coping behaviour (American Psychiatric Association, 2013), rather than facilitating memory retrieval. Gaze aversion in AuDHD individuals reflects broader challenges in self-regulation (e.g., stress adaption), whereas non-AuDHD individuals may use it to optimize memory recall. Therefor implying that there are differences in type and duration of gaze aversion, even if duration in this study appears similar. Future research should examine whether gaze aversion patterns differ between groups, as this could help clarify whether such behaviours serve psychological functions in AuDHD and non-AuDHD.

AuDHD individuals often experience executive dysfunction, including impaired inhibitory control and working memory (Barkley, 1997), which may reduce their ability to suppress self-soothing behaviours, such as fidgeting (Blair & Diamond, 2008). This could explain why AuDHD participants exhibited longer durations of nonverbal behaviours. Alternatively, the lack of difference between AuDHD and non-AuDHD individuals might indicate no true difference exists, particularly since suspect status also failed to predict nonverbal behaviour. It was assumed that guilty participants would experience more stress and, therefore, exhibit more nonverbal behaviour. Notably, cognitive load scores were higher in guilty participants compared to innocent.

Contrary to expectations, no difference emerged in nonverbal behaviour duration between guilty or innocent participants. This aligns with Vrij et al. (2019), who argue that both guilty and innocent participants suppress behaviours they perceive as suspicious to avoid appearing deceptive. Additionally, they noted that such suppression could lead to similar

nonverbal behaviours between guilty and innocent participants. The attribution theory may provide further insight, which is that individuals attribute behaviour to internal (e.g., guilty or stress) or external factors (e.g., how they are perceived), influencing their self-presentation (Heider, 1958). Suspects may suppress gaze aversion or fidgeting as signs of guilt or stress (internal attribution) or assume these behaviours are perceived as deceptive (external attribution), to avoid being judged as guilty. The Hawthorne effect (Forsyth, 2019), whereby awareness of being observed alters behaviour, may further amplify this suppression. Especially since participants were reminded of the recording at the start of the interview. Additionally, Bogaard and Meijer (2020) further note that nonverbal cues, such as fidgeting and gaze aversion, influence perceived credibility of individuals' accounts. Therefore, implying that suspects actively suppress or alter their nonverbal behaviours to avoid being judged as guilty or deceiving which might explain the lack of differences across the four groups. Future research should explore which nonverbal behaviours suspects perceive as deceptive and why they suppress them.

The Dual Role of Nonverbal Behaviour for AuDHD Individuals

Nonverbal behaviour can serve as either essential for establishing rapport (Tickle-Degnen & Rosenthal, 1990) and as self-soothing for AuDHD individuals (American Psychiatric Association, 2013). In this study, we speculate whether the total frequency of nonverbal behaviour for AuDHD individuals reflects rapport, cognitive load, self-soothing behaviours or other unmeasured factors. Unexpectedly, innocent AuDHD participants exhibited more frequent nonverbal behaviours and gaze aversions than guilty AuDHD participants. One possible explanation is masking of nonverbal behaviours, as AuDHD individuals often engage in masking behaviours to adapt to social environments (Alaghband-rad et al., 2023). This is particularly relevant given that the sample consisted primarily of university students, who are more likely to engage in masking behaviours to meet social

expectations (Dell'Osso et al., 2022). However, masking alone does not fully explain this pattern, as it would likely affect all AuDHD, not just guilty AuDHD participants.

Another potential explanation involved rapport. It was expected that rapport would mediate the relationship between neurodiversity status and nonverbal behaviour, with cognitive load moderating these effects. Consistent with Tickle-Degnen and Rosenthal (1990), higher rapport scores predicted increased nonverbal behaviour, likely due to a warm, open and friendly interaction. Interestingly, rapport scores were found to be high and similar across groups, suggesting that participants perceived the interview generally as positive. This may explain the lack of differences in nonverbal behaviour, as non-AuDHD participants may have exhibited nonverbal behaviour due to established rapport. However, the Tripartite Model of Rapport (Tickle-Degnen & Rosenthal, 1987) may not align with the nonverbal behaviour of AuDHD individuals as previously mentioned in the Introduction section. The high rapport scores for AuDHD individuals may potentially be due to neurotype matching as the interviewer is diagnosed with ADHD. Crompton et al. (2020) noted that autistic individuals experience high interactional rapport when interacting with other autistic individuals. Notably, AuDHD participants under low cognitive load demonstrated fewer nonverbal behaviours when rapport was relatively low. Suggesting that they do not respond to rapport in the same way as non-AuDHD participants. However, this effect disappears under high cognitive load. Future research should investigate the role of rapport and neurotype matching in investigative interview, as the interviewers' neurotype may influence rapport-building.

Contrary to expectations, increased nonverbal behaviour did not correlate with higher cognitive load. Memon et al. (2020), suggests that stress impairs memory recall, leading to higher cognitive load. However, innocent participants reported lower cognitive load than guilty participants, which aligns with findings that guilty individuals experience higher cognitive load due to the need to maintain a lie (Vrij et al., 2011). However, the finding that

innocent AuDHD participants exhibited more nonverbal behaviour despite lower cognitive load suggests additional influencing factors. Interestingly, after the interview, participants were asked about their thoughts on the study, and many innocent participants indicated confusion about the person-oriented questions, which may have contributed to the observed differences in nonverbal behaviour. This aligns with literature that suggests that individuals with AuDHD have a lower threshold for uncertainty (South & Rodgers, 2017). Uncertain situations, such as confusions during interaction, can heighten cognitive load and result in more stress-adaptive behaviours. However, these explanations contradict the cognitive load scale. The similar and centralized means across groups suggest that the cognitive load scale may not have accurately measured the intended construct.

Moreover, cognitive load did not moderate the proposed effects and may not have captured the intended construct. Thus, rapport mediated effects (supporting Hypothesis 2), cognitive load did not moderate them. Future research should explore alternative cognitive load measures to determine whether different assessment yield more meaningful results. Additionally, further investigation is needed to understand the complex interplay between cognitive load, rapport and nonverbal behaviour in investigative interviews.

Strengths, Limitations and Future Directions

This study has several strengths. First, this study is to our knowledge the first to examine duration of nonverbal behaviour in AuDHD individuals during investigative interviews. Another strong suit is the usage of a VR environment combined with the case vignettes. These did not only provide participants with a realistic mock-burglary scenario but also induced a psychological feeling of guilt or innocence. Particularly as VR usage for studying criminological topics has been found a fitted research method without ethical or practical issues (van Sintemaartensdijk & Meenaghan, 2024).

Several limitations were identified in this study. First, the majority of the AuDHD group was identified based on screening tools rather than formal diagnoses. The final sample was not representative of a broader population, as it primarily consisted of university students and graduates, with only 11 participants having an official diagnosis of ASD and/or ADHD participants. This raises questions about the generalizability of the findings to the AuDHD community. Additionally, the small number of professionally diagnosed participants may explain the lack of differences found in nonverbal behaviour between the AuDHD and non-AuDHD groups. Therefore, future research should focus on nonverbal behaviours in investigative interviews conducted outside experimental laboratory settings and explore the impact interviewers' awareness of nonverbal behaviour. As, according to the attribution theory, individuals may assign certain behaviours such as gaze aversion to internal or external factors (e.g., guilt or stress), which can influence how these behaviours are perceived (Heider, 1958*). When the interviewer is aware of the diagnosis of the individual, the exhibited nonverbal behaviour can be assigned to an internal factor, such as AuDHD this can reject potential biases regarding nonverbal cues. This would provide a better understanding of the observed differences in nonverbal behaviour between the groups.

Second, the study design did not include feedback moments, which are essential for fully understanding participants' perceived rapport and cognitive load. For example, a finding was discussed based on unintentionally gathered feedback from participants. Therefore, it is recommended to implement a short feedback session after the interview to better understand the effectiveness of the rapport and cognitive load scale. It is expected that the cognitive load scale did not accurately measure the intended construct. A follow-up study should incorporate qualitative data collection to fully explore the interactions between the scales and participants' perceived experiences during the interview.

Last, conducting a laboratory study reduces ecological validity, limiting the generalizability of the findings to real-world settings. To enhance realism, a VR environment was used, and participants were probed for the investigative interview. However, this approach may not fully capture the complexity of real investigative interviews. Several confounds further limit the study's validity, such as the usage of multiple experimental rooms which introduced variability in the experimental setup. For instance, gaze aversion was particularly difficult to code accurately from a side view. This inconsistency may have affected the reliability of the findings. Additionally, interrater reliability was not assessed for the coded behaviours.

Conclusions

This study is among the first to investigate how suspect status, rapport and cognitive load shape nonverbal behaviour in AuDHD and non-AuDHD individuals during investigative interviews. While the findings provide valuable insight into nonverbal behaviour duration differences, further research is needed to unravel the mechanisms driving these behaviours. For instance, gaze aversion in AuDHD individuals may reflect self-regulation rather than deception or memory recall, underscoring the need to interpret nonverbal cues through a neurodivergent lens. Additionally, a deeper understanding of rapport-building in AuDHD individuals, including the role of neurotype matching is essential to mitigate biases that may lead to misinterpretation. Adapting rapport-building strategies by incorporating AuDHD communication styles may facilitate better rapport. As future research further explores these findings, practitioners can refine interview approaches to recognize and interpret AuDHD behavioural cues, ultimately improving credibility assessments and ensuring fairer investigative practices. Ultimately, refining investigative interview techniques to account for neurodivergent communication styles is a crucial step for ensuring fair legal procedures, reducing bias, and protecting vulnerable individuals from wrongful convictions.

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Appendix A: Usage of AI Tools

During the preparation of this work the author used ChatGPT for brainstorming and to refine the structure and clarity of the text, as thesaurus, and for solving errors in R. After using this tool, the author reviewed and edited the content as needed and takes full responsibility for the content of the work.

Appendix B: Case Vignettes

Case Vignette – Burglar

Imagine yourself in the following situation: You are walking your usual route through a neighbourhood and have noticed multiple times that a pink house often has its front door open. You've scouted this house before, but today you decide to enter the house, as it appears no one is inside. Recently, you've had financial setbacks, making it difficult to buy groceries. Standing in the empty house, something shifts in your mind, and you decide to burglarize the house by taking valuable items.

Case Vignette – Visitor

Imagine yourself in the following situation: You're looking for a new home, and there is an open house event in a nearby neighbourhood. Since it's close by, you decide to walk there. You see a pink house with an open front door and assume it must be the one for the viewing. As you're looking for a new home and the door is open for the open house, you decide to enter the house, thinking a realtor may be present.

Appendix C: Visual Representation of Investigative Interview Rooms

Figure 5

Front-Facing View of Participant in Smaller Room

Figure 6

Side-Facing View of Participant and Interviewer in Larger Room

Appendix D: Interview Script

Opening the interview
Hello, I would like to talk to you about a recent burglary in the neighbourhood. A neighbour reported seeing you in the area around [time of the VR study]. I would like to ask you a few questions to understand whether you know anything about the incidents.

I would like to go over some ground rules for today, alright? For your protection and for mine I will record this, so we get a full account of what was said today. Also, when you're talking, I'm not going to interrupt you, and I hope you can do the same for me. If you have any questions, please ask me. I might ask you to repeat some things because I want to make sure I understand everything. Does that make sense?

The main purpose here is to get as much information as possible. So, it is important that you tell me everything in as much detail as possible without leaving things out. This is important because I wasn't there, so I don't know what happened. Do you understand?

Personal oriented interview
Before we start with specific questions, I would like to get to know you better:

1. Where do you live? With whom do you live?
2. Do you have a job? How long have you worked there, and what are your main tasks?
3. What do you study? Do you enjoy it, why?
4. What does a typical week look like for you?
5. Do you have any hobbies? Could you describe for me what you like about your hobbies?

Now I will ask you some more specific questions. You may have already answered them, but if that is the case, please answer them again.
As mentioned, you are here to talk about a recent burglary in the neighbourhood. A neighbour reported seeing you in the area around [time of the VR study] and we have some question about that.

Case specific interview

1. Please tell me in as much detail as possible, why you were in the neighbourhood?
2. Describe in as much detail as possible what you were doing while you were in the neighbourhood?
3. What did you see or notice while you were in the neighbourhood? Please tell me, in as much detail as possible.
4. What other details can you tell me that might be important? Is there anything else you noticed that you haven't mentioned?
5. Did you see anyone else in the neighbourhood? If so, please describe them and the interactions you had.
6. A neighbour noticed a person looking like you entering a house. Can you please explain why you entered the house?

a. ENTERED THE HOUSE: Please tell me in as much detail your purpose of entering the house?

b. DID NOT ENTER THE HOUSE: If you did not enter the house, how do you explain a neighbour seeing a person looking like you entering the house?

i. ALIBI: Okay, I understand you didn't enter the house, can you tell me what you did that day?

7. Is there anything else you would like me to know?

[After questioning] Thank you very much for your time and information. I have everything we need for now. You can wait here, and the research assistant will be in to see you.

Appendix E: Presence and Cybersickness from Virtual Environment

Presence

Please answer the following questions about the virtual environment you were just in.

Table 5

7-Item Likert Scale Measuring Presence in the Virtual Environment

	Strongly Disagree (1)	Somewhat Disagree (2)	Neither Agree nor Disagree (3)	Somewhat Agree (4)	Strongly Agree (5)
I felt like I was actually in the virtual neighbourhood (1)					
I felt like I was part of the virtual environment (2)					
It felt like I was physically present in the virtual environment (3)					
The items in the virtual environment gave me the feeling I could use them (4)					
I felt I could be active in the virtual environment (5)					
I felt I could move around the items in the virtual environment (6)					
It felt like I could do anything I wanted in the virtual environment (7)					

Cybersickness

Indicate to what extend the following symptoms were present/experienced during your time in the virtual environment:

Table 6

5-item Likert Scale Measuring Cybersickness During and After the VR Experience.

	Strongly Disagree (1)	Somewhat Disagree (2)	Neither Agree nor Disagree (3)	Somewhat Agree (4)	Strongly Agree (5)
The virtual environment made me nauseous (1)					
The virtual environment made my stomach ache (2)					
The environment made me dizzy (3)					
The environment made me lack focus (4)					
The environment blurred my vision (5)					

Appendix F: AQ-10 and Scoring

Table 7

10 items from Autism Quotient (AQ-10) for Screening Autism in Adults

	Please tick one option per question only:	Definitely Agree	Slightly Agree	Slightly Disagree	Definitely Disagree
1	I often notice small sounds when others do not				
2	I usually concentrate more on the whole picture, rather than the small details				
3	I find it easy to do more than one thing at once				
4	If there is an interruption, I can switch back to what I was doing very quickly				
5	I find it easy to 'read between the lines' when someone is talking to me				
6	I know how to tell if someone listening to me is getting bored				
7	When I'm reading a story I find it difficult to work out the characters' intentions				
8	I like to collect information about categories of things (e.g. types of cars, types of bird, types of train, types of plant etc)				
9	I find it easy to work out what someone is thinking or feeling just by looking at their face				
10	I find it difficult to work out people's intentions				

Scoring: Only 1 point can be scored for each question. *Score 1 point for Definitely or Slightly Agree on each of items 1, 7, 8, and 10. Score 1 point for Definitely or Slightly Disagree on each of items 2, 3, 4, 5, 6, and 9.* If the individual scores **six or above**, consider referring them for a specialistic diagnostic assessment.

Appendix G: ASRS v.1.1 Screener and Scoring

Table 8

Adult ADHD Self-Report Scale (ASRS-v1.1) Symptom Checklist – Part A

		Never	Rarely	Sometimes	Often	Always
1	How often do you have trouble wrapping up the final details of a project, once the challenging parts have been done?					
2	How often do you have difficulty getting things in order when you have to do a task that requires organization?					
3	How often do you have problems remembering appointments or obligations?					
4	When you have a task that requires a lot of thought, how often do you avoid or delay getting started?					
5	How often do you fidget or squirm with your hands or feet when you have to sit down for a long time?					
6	How often do you feel overly active and compelled to do things, like you were driven by a motor?					

Scoring: Only 1 point can be scored for each question. *Score 1 point for Sometimes, Often or Always on each of items 1, 2 and 3. Score 1 point for Often or Always on each of items 4, 5 and 6.* If the individual scores **four or above**, consider referring them for a specialistic diagnostic assessment.

Appendix H: Self-Reported Rapport-Building Questionnaires

RS3i (Duke et al., 2018)

Below you will find various statements on a scale from 1 = "Strongly disagree" to 5 = "Strongly agree". Please pick the answer that best describes the way you feel.

Table 9

Rapport Scale for Investigative Interviews and Interrogations (RS3i) Interviewee Version

	1 (Strongly Disagree)	2 (Disagree)	3 (Neither Agree nor Disagree)	4(Agree)	5(Strongly Agree)
I think the police officer was generally honest with me.					
The police officer was skilful during the interaction.					
The police officer seemed to respect my knowledge.					
The police officer and me have our culture in common.					
The police officer performed expertly during the interaction.					
I think that the police officer can generally be trusted to keep their word.					
The police officer and me probably share the same ethnicity.					
The police officer really listened to what I had to say.					
I was motivated to perform well during the interaction.					
I feel I can trust the police officer to keep his word to me.					
The police officer made an effort to do a good job.					

The police officer acted like a professionals.
The police officer paid careful attention to my opinion.
The police officer and me got along well during the interaction.
The police officer and me worked well together as a team.
The police officer probably shares my culture.
I wanted to do a good job during the interaction.
The police officer was attentive to me.
Communication went smoothly between the police officer and me.
The police officer was interested in my point of view.
I felt committed to accomplishing the goals of the interaction.

Scoring: The total self-reported rapport score was calculated by summing the points from all the statements. *Strongly Disagree* is assigned 1 point and *Strongly Agree* is 5 points. A maximum of 105 points could be achieved. For analyses, the mean scores of each participant were used. A higher mean score indicated a higher level of self-reported rapport.

Interaction Scale (Bernieri, 1988)

Please rate the interaction between yourself and the police officer on each of the characteristics listed below on a scale from 1 = "Strongly disagree" to 5 = "Strongly agree". Please pick the answer that best describes the way you feel.

Table 10

Rapport Scale for Interaction Between the Interactants

The interaction seemed…

	1 (strongly disagree) (1)	2 (disagree) (2)	3 (neither agree nor disagree) (3)	4 (agree) (4)	5 (strongly agree) (5)
...well-coordinated. (1)					
...cooperative. (2)					
...harmonious. (3)					
...positive. (4)					
...friendly. (5)					
...respectful. (6)					
…attentive. (7)					

Scoring: The total self-reported rapport score was calculated by summing the points from all the statements. *Strongly Disagree* is assigned 1 point and *Strongly Agree* is 5 points. A maximum of 35 points could be achieved. For analyses, the mean scores of each participant were used. A higher mean score indicated a higher level of self-reported rapport.

Appendix I: Self-Reported Cognitive Load Questionnaires

Table 11

Cognitive Load Scale for Processes and Verbalizing the Memory

	1 (Strongly Disagree)	2 (Disagree)	3 (Neither Agree nor Disagree)	4(Agree)	5(Strongly Agree)
I found it difficult to explain the order of events while being interviewed.					
I noticed that I shared more information than I wanted to when answering the police officer's questions.					
I found it difficult to answer the police officer's questions as fully as I wanted to.					
I felt that it took me a long time to think through how to answer the police officer's questions.					
Sometimes after giving an answer, I wished I could go back and restart or change my answer.					
I found it difficult to translate the mental story I created into an actual statement.					

Table 12

Cognitive Load Scale for Retrieving the Memory

	1 (Strongly Disagree)	2 (Disagree)	3 (Neither Agree nor Disagree)	4(Agree)	5(Strongly Agree)
When answering the police officer's questions, I found it difficult to remember the details I wanted to talk about.					

I found it difficult to remember my overall story when answering the police officer's questions.	
I seemed to forget what I already told the police officer and what I did not.	
It required all my concentration to answer the police officer's questions.	
It was hard work to remember what I wanted to say.	

Scoring: The total cognitive load score was calculated by summing the points from all the statements. *Strongly Disagree* is assigned 1 point and *Strongly Agree* is 5 points. A maximum of 55 points could be achieved. For analyses, the mean scores of each participant were used. A higher mean score indicated a higher level of cognitive load.

Appendix J: Motivation and Willingness to Return

Motivation

Please describe your motivation before and during your participation

Table 13

Motivation Questionnaire to Measure Participant's Motivation

	Not motivated at all (1)	Not very motivated (2)	Slightly motivated (3)	Motivated (4)	Very motivated (5)
How motivated were you before your participation? (1)					
How motivated were you during your participation? (2)					

Willingness to Return and Legal Representation

Below you find two statements concerning a follow-up interview about the incident. Please tick the answer that best describes the way you feel.

Table 14

Willingness to Return and Legal Representation

	Yes (1)	No (2)
Would you be willing to return to a more in-depth interview? (1)		
Would you want legal representation during any such interview? (2)		

Appendix K: Coding of Nonverbal Behaviours

Table 15

Coding Scheme for Nonverbal Behaviour in BORIS

Key	Behaviour Code	Definition	Modifier
B	Body Activity	Movements of the head, arms, legs, feet and/or postural shifts or leans from the suspect (such as pointing, waving)	Adjusting Posture (&) Shifting of Weight (*) Stretching (+) Nodding or Shaking (^) Gesture (%) Talking with Hands (#)
F	Fidgeting	Small repetitive body movements involving objects (such as jewellery, clothing)	Jewellery (J) Clothes (C) Hands (H) Hair (G) Face (F)
G	Gaze Aversion	The suspect turns or shifts eyes away from the interviewer	Shifting of Direction (0) Up (1) Down (2) Left (3) Right (4)
S	Stimming	Highly repetitive or rhythmic body movements by the suspect (such as tapping with hand or feet, lip biting or excessive blinking)	Foot (1) Hand (2) Excessive Blinking (3) Touching of Face (4)
U	Unexpected Facial Expression	Facial expressions that do not align with the expected expressions (such as laughing, smiling or delayed facial responses)	Smiling (S) Laughing (L) Exaggerated (E) Blinking (B) Flat or lack of response (F) Later Response (L)

Outcome of coding: Behaviours were logged as state events, which are observations based on a duration, with timestamps for their start and end, allowing for frequency counts and duration calculations. For example, participant 1 exhibited ‘Fidgeting’ from 01:48,333 to 01:52,435.

Appendix L: Examining Duration of Nonverbal Behaviours

Due to violations of normality and the presence out outliers, additional analyses were conducted to assess whether the results were impacted by removal of the outliers. A two-way ANOVA showed that removing the outliers did affect the data set, as can see by a higher F value for the suspect status $F(1, 91) = 3.09$, $p = .08$ and the interaction effect $F(1, 91) = 0.42$, $p = .52$, while the opposite occurred for neurodiversity status $F(1, 91) = 2.58$, $p = .11$. Removing the outliers did change the data and it altered the significance of the neurodiversity status group. Independent sample t-tests were conducted to assess the differences between guilty AuDHD participants (M = 307s, SD = 179s) and innocent AuDHD participants (M = 251s, SD = 180s) was. No statistically significant difference is found between the groups, $t(48) = 1.09$, $p = .28$).

Fidgeting

A two-way ANOVA was conducted to assess the effects of neurodiversity status and suspect status on fidgeting. No statistical significance was found for neither neurodiversity status, $F(1,93) = 0.01$, $p = 0.93$, $\eta^2 = <.001$, nor for suspect status $F(1,93) = 0.02$, $p = 0.89$, $\eta^2 = <.001$. Moreover, no interaction effect was observed between neurodiversity status and suspect status, $F(1,93) = 1.67$, $p = .20$, $\eta^2 = .02$.

Gaze Aversion

A two-way ANOVA was conducted to assess the effects of neurodiversity status and suspect status on gaze aversion. No statistical significance was found for neither neurodiversity status, $F(1,93) = 3.50$, $p = 0.07$, $\eta^2 = .04$, nor for suspect status $F(1,93) = 1.23$, $p = .27$, $\eta^2 = .01$. Moreover, no interaction effect was observed between neurodiversity status and suspect status, $F(1,93) = 0.04$, $p = .85$, $\eta^2 = <.001$.

Appendix M: Assumptions and non-parametric test for Nonverbal Behaviour

The data is skewed to the right, see Figure 7, moreover with statistical tests is found that the data is not normally distributed, and the presence of outliers is observed, see Figure 8. Due to violations of normality and the presence of outliers, additional analyses were conducted to assess whether the results were impacted by removal of the outliers.

Figure 7

Density Plot of Frequency of Nonverbal Behaviour (n = 97)

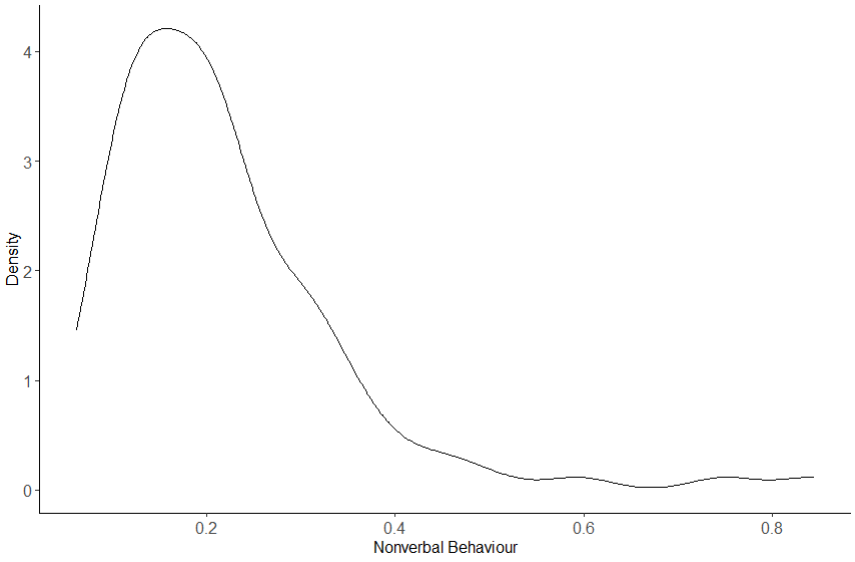
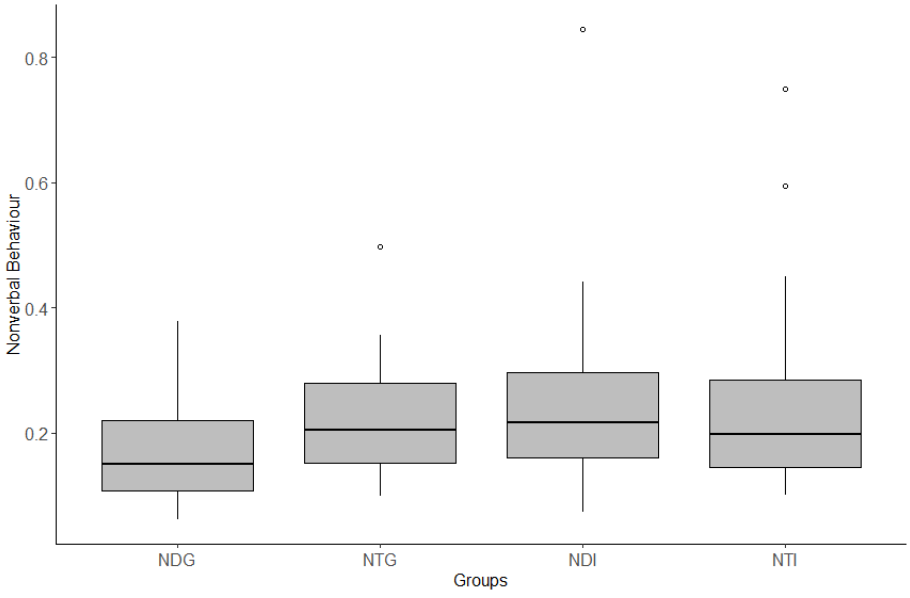


Figure 8

Boxplot of Frequency of Nonverbal Behaviour Across the Groups



Note. NDG = AuDHD/ guilty; NTG = non-AuDHD/ guilty, NDI = AuDHD/ innocent and NTI = non-AuDHD/ innocent.

A two-way ANOVA was conducted, which showed that removing outliers did affect the dataset, as can see by a higher F value for the neurodiversity status $F(1, 89) = 0.53$, $p = .47$ and the interaction effect $F(1, 89) = 3.42$, $p = .07$, while the opposite occurred for suspect status $F(1, 89) = 2.03$, $p = .16$. Although, removing the outliers did change the data, it did not alter the significance of the groups.

Non-parametric testing

The data sample had violated normality, even when outliers removed, therefore a Wilcoxon rank-sum test was conducted. No statistically significant difference of nonverbal behaviour was found between AuDHD ($Mdn = 0.17$, $IQR = 0.14$) and non-AuDHD participants ($Mdn = 0.20$, $IQR = 0.12$), $W = 968$, $p = .14$, $r = .15$. These findings suggest that the groups overlap in the frequency of nonverbal behaviour. A near significant effect was perceived between guilty ($Mdn = 0.18$, $IQR = 0.13$) and innocent participants ($Mdn = 0.21$, $IQR = 0.15$), $W = 940$, $p = .09$, $r = .17$. Moreover, a statistically significant difference of nonverbal behaviour was found between AuDHD guilty ($Mdn = 0.12$, $IQR = 0.09$) and AuDHD innocent ($Mdn = 0.23$, $IQR = 0.17$), $W = 187$, $p = .01$, $r = .35$. These results indicate that guilty participants exhibited less often nonverbal behaviours compared to innocent participants when in the AuDHD group. Not only is this difference statistically significant, but the effect size also suggests a moderate effect.

Appendix N: Assessing Self-Reported Rapport

As mentioned, in the Methods section, the interviews were conducted by a single interviewer, with the role alternated between two researchers. An independent sample t-test was conducted to assess the effects of this alteration on the rapport scores. No significant difference was observed between the interviewers, $t(95) = 0.42$, $p = .68$, 95% CI [-0.25, 0.38].

Scores for self-rated rapport ($N = 102$) were overall higher for the non-AuDHD participants as guilty ($M = 4.20$, $SD = 0.60$) and innocent ($M = 4.06$, $SD = 0.49$) than AuDHD guilty ($M = 3.90$, $SD = 0.57$) and AuDHD innocent ($M = 3.98$, $SD = 0.66$). A two-way ANOVA was conducted to examine the effects of neurodiversity status (AuDHD vs. non-AuDHD) and suspect status (guilty vs. innocent) on self-reported rapport. The main effects were neither statistically significant for neurodiversity status, $F(1, 98) = 2.84$, $p = .09$, $\eta^2 = .03$, and for suspect status, $F(1, 98) = 0.02$ $p = .81$, $\eta^2 = <.001$. Similarly, there was no statistically significant difference observed for the possible interaction effect between neurodiversity status and suspect status, $F(1, 98) = 0.97$ $p = .33$, $\eta^2 = .01$.

Independent sample t-tests show no statistically significant difference for non-AuDHD guilty compared to non-AuDHD innocent participants $t(48) = 0.92$, $p = .36$, 95% CI [-0.17, 0.46]. Similarly, no statistically significant difference for AuDHD guilty compared to AuDHD innocent participants, $t(50) = - 0.49$, $p = .63$, 95% CI [-0.43, 0.26]. However, several outliers were present in the AuDHD group, suggesting there were participants who perceived less rapport compared to others.

Assumption Checking and Removal of Outliers

Due to violations of normality and the presence of outliers, additional analyses were conducted to assess whether the results were impacted by removal of the outliers. A two-way ANOVA was conducted, which showed that removing outliers did affect the dataset, as can see by a higher F value for the Suspect Status $F(1, 96) = 0.06$ $p = .8$ and the interaction effect

$F(1, 96) = 1.12$ $p = .29$, while the opposite occurred for neurodiversity status $F(1, 96) = 1.60$, $p = .21$. Although, removing the outliers did change the data, it did not alter the significance of the groups. These results indicated that rapport was higher in the non-AuDHD than in the AuDHD condition, however these findings were not statistically significant. Overall, AuDHD guilty participants reported the lowest rapport score.

Appendix O: Assessing Cognitive Load

Scores for cognitive load (N = 102) were overall higher for the non-AuDHD participants as guilty (M = 2.58, SD = 0.74) and innocent (M = 2.30, SD = 0.68) than AuDHD guilty (M = 2.74, SD = 0.71) and AuDHD innocent (M = 2.24, SD = 0.79). A two-way ANOVA was conducted to test for effects of neurodiversity status (AuDHD vs. non-AuDHD) and suspect status (guilty vs innocent) on cognitive load. The effects were not statistically significant for neurodiversity status, $F(1, 98) = 0.17$, p =.68, η^2 = <.001. However, the main effects were statistically significant for suspect status, with cognitive load being higher in the guilty group (M = 2.66, SD = 0.72) compared to the innocent (M = 2.27, SD = 0.73), $F(1, 98) = 7.50$, p =.01, η^2 = .07. No interaction effects between neurodiversity status and suspect status were observed, $F(1, 98) = 0.56$, p =.46, η^2 = <.001. Indicating that the interaction of neurodiversity status and suspect status did not explain variation in Cognitive Load.

Independent sample t-tests showed that cognitive load was statistically significant lower for AuDHD innocent than AuDHD guilty group, $t(50) = 2.41$, p = .02. Cohen's d was calculated and was found to be -1.24 (95% CI [-0.68, -0.12]), indicating a large effect size, where the guilty group scored significantly higher on cognitive load compared to the innocent group. Additionally, no statistically significant difference was found between non-AuDHD innocent and non-AuDHD guilty, $t(48) = 1.42$, p = .16. The impact of the outlier was perceived as neglectable since all assumptions were met, and was assessed but did not alter the significance of any of the groups. The cognitive load scores were overall higher in guilty groups compared to innocent groups. We also observed that cognitive load is higher for AuDHD guilty participants compared to AuDHD innocent participants.