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‘Breaking down a barrier’: Autistic young people see virtual reality as a possible social support, but not a substitute for in-person interactions

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Abstract

Autistic people often face challenges in face-to-face social interactions, especially in unfamiliar or high-stakes situations. Virtual reality has been proposed as a tool to support social connection by offering a more controlled and accessible environment. While previous research has focused on virtual reality–based social skills training, little is known about how autistic people experience social interactions in virtual reality. We interviewed 22 autistic young people (aged 9–22 years, M_{Age} = 14.5) after they engaged in a social interaction with a stranger in immersive virtual reality. Using reflexive thematic analysis, we found that participants generally found virtual reality interactions tolerable, engaging and helpful as a low-pressure first step towards more challenging social situations. Virtual reality was valued for reducing sensory overload, increasing confidence and offering novel social opportunities. However, participants did not view virtual reality as a replacement for in-person interaction, which they saw as essential for building meaningful relationships. These findings highlight the potential of virtual reality to support autistic people by modifying the social environment rather than demanding behavioural change. They also challenge deficit-based assumptions about autistic social motivation, emphasising the importance of aligning technological supports with autistic people’s lived experiences and preferences.

Lay abstract

Autistic young people can find social situations stressful and overwhelming, particularly if meeting strangers in high-stakes settings (e.g. first date, job interview). Virtual reality has been suggested as a tool that might help make these interactions easier. In this study, we asked 22 autistic young people, aged 9–22, to try out a social interaction in virtual reality and then tell us about their experience. We found that most participants enjoyed using virtual reality and felt it made social interactions feel safer and less intimidating. They said virtual reality helped reduce distractions and gave them more control over how they presented themselves. Some even said it made them feel more confident when talking to others. However, young people were clear that virtual reality should not replace real-life interactions. They said that in-person contact is still important for building real connections with others. While virtual reality can be a helpful first step when interacting with new people, especially in situations that feel scary or unfamiliar, it is not a substitute for face-to-face relationships. This research shows that autistic young people value social connection and want tools that support, rather than replace, real-life interaction.

Keywords

autism, social interaction, virtual reality, young people

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Autistic people can face significant challenges when navigating face-to-face social interactions, particularly in unfamiliar environments, with strangers and in high-stakes situations such as dating (Hancock et al., 2020; Sala et al., 2020) or job interviews (Finn et al., 2023). While growing evidence suggests that these difficulties often stem from the stigmatised perception of autistic people by non-autistic people (e.g. Brosnan & Gavin, 2021; Norris et al., 2024), conventional wisdom in autism research and practice has attributed these challenges to a reduced ability or motivation among autistic people to understand, or engage in, social interactions (Baron-Cohen, 1995; Chevallier et al., 2012). Consequently, there has been considerable interest in the potential for immersive virtual reality (VR) via head-mounted displays (HMDs) to support social interaction outcomes for autistic people by mediating social skill training in realistically simulated yet controlled social interactions (e.g. Kourtesis et al., 2023; Politis et al., 2020). However, important concerns remain regarding the generalisability of VR-based training (Carnett et al., 2023), and whether such interventions are indeed safe or ethical (Evans et al., 2024). Indeed, there is growing consensus that social skills interventions can have negative long-term impacts on mental health outcomes by training autistic people to engage in cognitively demanding and stressful 'masking' strategies, such as making eye contact (Bottema-Beutel et al., 2018; Evans et al., 2024; Trevisan et al., 2017).

Significant progress has been made over the past decade in reconceptualising the factors that contribute to psychosocial outcomes experienced by autistic people, including building and maintaining friendships and intimate relationships, gaining employment and living independently (e.g. Kapp et al., 2013). Specifically, there is now amassing evidence that poor social interaction outcomes can result from various factors, including sensory challenges, anxiety and stigma-driven antisocial behaviour directed towards autistic people (Davis & Crompton, 2021; Kojovic et al., 2019). There is also now growing recognition that the lived experiences and priorities of autistic people should guide research and strategies for improving social outcomes (Pellicano et al., 2014). Müller and colleagues (2008) interviewed autistic adults about their daily social experiences in achieving social connection. Autistic adults described experiences of intense isolation; difficulties initiating and maintaining communication; and barriers to establishing a sense of belonging in intimate and community-based relationships. They also highlighted key priority areas for social supports that could improve their ability to form connections with others. These included structured and organised social activities, and alternative modes of communication (e.g. Internet-based communication platforms) that, by simplifying interactions (e.g. eliminating voice intonation or facial cues), could make them more accessible, and less overwhelming.

A large-scale qualitative investigation into autistic people's everyday experiences of life during the COVID-19 pandemic provided further support for the claim that online and technology-mediated social interactions can support autistic people in maintaining social connection with others (Pellicano et al., 2022). Many adults described the move to online interactions as facilitating a more autism-friendly world by removing some of the sensory, psychological and cognitive barriers that often must be overcome when accessing in-person interactions. Yet, the benefits of online interactions were mostly short-lived, with the vast majority of autistic people reporting intensely missed seeing their friends and family. They said that Zoom and FaceTime were insufficient substitutes for the physical, embodied interactions with other people, which make up most of day-to-day life. Furthermore, the prolonged physical isolation had critically negative impacts on people's mental health and well-being, highlighting that for many, including autistic people, there is no substitute for in-person social interaction – particularly when maintaining close social relationships. Indeed, further work has shown that autistic people deeply missed social interactions during the pandemic, not only for close relationships (i.e. 'close ties') but also incidental social contact with strangers and acquaintances (i.e. 'weak ties') (Pellicano & Heyworth, 2025).

Investment in VR increased during and since the pandemic, along with the promise that it would facilitate human connection and interaction in more meaningful ways than can currently be achieved with other online chat or video-based interaction platforms (Hamad & Jia, 2022; Singh et al., 2020). As VR has become more accessible, it has been suggested that social VR has the potential to provide an alternative modality for communication. This offers the opportunity for VR to support social outcomes for autistic people by modifying some of the environmental, societal and structural factors that can make social interactions more challenging, rather than demanding behavioural change from autistic people themselves. For instance, VR can provide a less intimidating environment for social interactions, which may be particularly beneficial for autistic people who experience anxiety about travelling to new places that may present unexpected sensory challenges (South & Rodgers, 2017). VR can also reduce the fidelity or intensity of social stimuli (e.g. eye gaze), which some autistic people can find uncomfortable to look at (Caruana et al., 2018; Trevisan et al., 2017).

Despite these notable opportunities, there is currently no research that has sought to understand how autistic people experience social interactions in VR, nor their perspectives on its utility as an alternative modality for interacting with others. Rather, most autism–VR studies have explored the use of VR as a means to assess or train social cognition and communication – and many of these studies have used very broad conceptualisations of VR as either (1) computer

screen tasks such as desktop 3D worlds, collaborative virtual learning environments and serious games (Didehbani et al., 2016; Kandalaft et al., 2013) or (2) semi-immersive environments with screen-projected 'CAVE' set-ups (e.g. Ip et al., 2018). Fewer studies have explored the use of emerging VR technologies that support immersive social experiences using HMDs and integrated body sensors (e.g. eye and hand movement). The exception to this has been studies exploring the tolerability of HMDs by autistic people, with largely positive experiences reported by autistic young people and adults (Newbutt et al., 2016, 2020). Importantly, the primarily explored use case of VR as a social skill training tool has failed to deliver robust evidence for the generalisability of social competencies (Azman et al., 2025; Yang et al., 2025). Existing studies have also failed to demonstrate that social skill training leads to improvements in broader social outcomes, including relationship building and social connection (Azman et al., 2025). Indeed, such interventions are met with concerns that they may promote masking behaviours that potentially harm autistic people (Evans et al., 2024).

The current study thus aimed to address two major gaps: (1) the paucity of HMD-based autism research relative to the dominance of non-immersive paradigms (e.g. Caruana et al., 2023; Cheng et al., 2015; Trepagnier et al., 2002) and (2) the absence of studies exploring VR as an alternative social venue rather than as an instrument for social cognitive normalisation (e.g. Wallace et al., 2017). To achieve this, we interviewed 22 autistic young people (9–22 years) after they engaged in a social interaction with a stranger using immersive VR. We elicited the experiences of autistic young people as they engaged in social interactions with a stranger in VR, as well as their perspectives on the usefulness of VR as an alternative mode of communication.

Our study specifically targeted young people for two key reasons. First, adolescence and early adulthood marks a critical period of social cognition development (Choudhury et al., 2006), with increased opportunities and demands for interactions with new people as social networks often begin to extend beyond a person's home and school (Brizio et al., 2015). Second, we wanted to gain the perspectives of people who were old enough to safely use VR technology, and who were most likely to engage in VR technology as an alternate mode of communication. Thus, this age group offered relevant perspectives, from likely users, who were at a life stage where the need and challenges around achieving social connection with others are intensified.

Methods

Participants

Twenty-two autistic ($n = 22$, $M_{age} = 14.45$; $SD = 3.17$; six females) young people aged between 9 and 23 years, were invited to take part. Participants provided written, informed consent and parents of participants under 18 years also provided written consent for their children to take part. All procedures were carried out in accordance with the protocol approved by the Macquarie University Human Research Ethics Committee. Participants were reimbursed $20/h (AUD) for their participation. This study was part of a larger project examining social attention and coordination during virtual reality interactions (Caruana et al., 2023).

Table 1. Participant characteristics.

	M	SD	Range
Age (years)	14.45	3.17	9–22
WASI-II			
VCI	113.17	16.47	70–135
PRI	114.94	16.10	77–138
FSIQ-4	117.78	14.17	99–137
STAI-B			
Before interaction	11.23	2.64	6–15
After interaction	11.05	3.24	6–15
ADOS-2 (autistic)			
Communication	1.94	5.56	0–6
Social Interaction	5.56	4.30	0–14
Communication + Social Interaction	7.50	5.32	0–18

Note. Descriptive statistics are provided for sample characteristics including age in years and scores on the following standardised measures: WASI-II (Wechsler Abbreviated Scale of Intelligence–Second Edition; Wechsler, 2011); VCI (Verbal Comprehension Index); PRI (Perceptual Reasoning Index); FSIQ-4 (Full-Scale IQ using all four subtests); STAI-B (Brief 6-item state anxiety scale); and ADOS-2 (Autism Diagnostic Observation Schedule; Lord et al., 2000). ADOS-2 scores were based on Module 4 observations, except for two autistic young people who were observed using Module 3.

Our sample comprised verbal young people without an intellectual disability. Participants completed the Wechsler Abbreviated Scale of Intelligence–Second Edition (WASI-II; Wechsler, 2011) and Autism Diagnostic Observation Schedule, Second Edition (ADOS-2; Lord et al., 2000)[1] as part of our earlier study on social coordination in VR (Caruana et al., 2023). Scores are reported again here to help characterise our sample (see Table 1). For the WASI-II, we calculated the Verbal Comprehension Index (VCI), Perceptual Reasoning Index (PRI) and Full-Scale IQ using all four subtests (FSIQ-4); however, scores for four participants are unavailable because they declined to complete the assessment. ADOS-2 data were also unavailable for six participants who declined to complete the assessment. Subscale scores for Communication, Social Interaction and Communication and Social Interaction are reported as they are most directly relevant to the current study's focus on social interaction experiences.

Finally, we administered a brief 6-item measure of state anxiety (STAI-B; Marteau & Bekker, 1992) for all participants immediately before and after they competed the social VR task (described below), to characterise their

Figure 1. (a) Virtual environment used for initial immersion; (b) dyads interacting in the physical environment; and (c) dyads interacting in virtual environment.

emotional state before and after the VR experience. Descriptive statistics for all participant measures are summarised in Table 1.

Procedure

Social virtual reality exposure. Participants in this sample had no prior experience of social interactions in immersive VR. To provide participants with some contextual information on what social VR can involve, they first completed a collaborative social interaction task with a member of our research team in VR (Figure 1). Participants had not interacted previously with this person before attending the study session. The social task was part of an experiment used in another study examining social information processes during joint attention (Caruana et al., 2023). Participants were first familiarised with the task and equipment, using standardised task instructions (osf.io/pkx9f). Participants were then introduced to the person they would complete the interactive task with (hereafter referred to as the 'VR partner'). The VR partner was introduced as a member of the research team. Two VR partners were used across the study, one male and one female, in an attempt to sample a mix of male–male (autism: $n=9$; non-autistic: $n=10$), female–female (autism: $n=0$; non-autistic: $n=2$) and male–female interactions (autism: $n=13$; non-autistic: $n=10$). Participants and their VR partners were assigned avatars that matched their self-declared gender and were immersed in a virtual space (see Figure 1). The interaction during this task was entirely non-verbal and involved using explicit hand-pointing gestures to collaboratively identify a target on each trial. The interface also enabled players to naturally control the eye, head and hand movements of their avatar in real time. A detailed description of the procedure for task set-up and completion are provided in Supplementary Material 1. Further detailed descriptions of the virtual interactive paradigm, task instructions, apparatus and associated experimental code, behavioural data and analysis code are all available within and alongside our earlier study implementing this task in the same sample of participants (osf.io/pkx9f).

Semi-structured interview. Following participation in the social VR task, participants took part in individual semi-structured interviews with one of the researchers (not the VR partner) and after the VR partner had left the room. A complete interview schedule and visual prompts can be found in the qualitative interview component of our OSF project page (osf.io/fkrnc). Before the interview, we prompted participants to think about their own experience in VR but also asked them to reflect on other possible VR environments, such as job interviews in a corporate setting, a date in a café, a classroom. We also asked them to consider environments that enabled verbal communication. Visual prompts depicting social scenarios in VR, along with portable VR systems, were provided as an additional layer of exposure prior to the interview.

Young people were initially asked about their daily routines and social experiences as a way of contextualising subsequent questions that explored their social experiences in VR, and whether VR technology was perceived to offer any possible benefit for supporting social interaction outcomes. Parents of participants under the age of 18 years were allowed to observe the session. Questions were not directed at parents, but any comments made by parents during the interview were included in subsequent transcripts and considered during the thematic analysis when they were endorsed by the participant (see below). We conducted these interviews over a 2-year period (May 2019–April 2022) that included interviews before ($n=8$) and after ($n=14$) the onset of the COVID-19 pandemic.

Analysis. All 22 interviews were recorded and transcribed verbatim by the research team. Our qualitative analysis was informed by our collective experience and training in psychology (N.C., T.G., E.P.), human–technology interactions (N.C.) and education (E.P.), and our alignment with the neurodiversity approach to research and practice. Two authors (T.G. and N.C.) engaged in reflexive thematic analysis, using an inductive approach (Braun & Clarke, 2006, 2019). We approached our analysis from a *constructivist* ontological stance, which assumes that reality is not singular or objective but is instead socially and

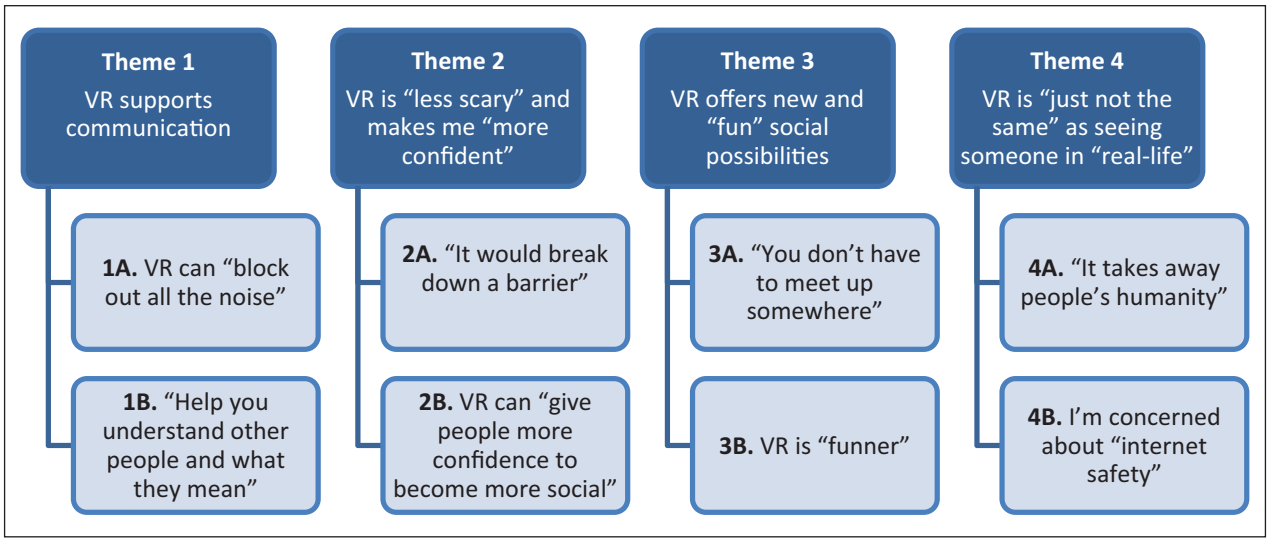

Figure 2. Thematic map. Figure summarises identified themes and subthemes on autistic young people's experiences and perspectives on virtual reality technology as a tool for social communication and interaction.

experientially constructed by individuals. This perspective acknowledges that autistic individuals' experiences of social interactions in VR are shaped by their unique contexts, identities and interpretations. Epistemologically, we adopted an *interpretivist* approach, emphasising the importance of understanding the meanings participants assign to their experiences. Our analysis specifically focused on experiences, expectations and perceptions of social VR. Following an initial, independent analysis of all transcripts by both authors, they then met regularly to discuss themes and codes through an iterative process to determine a tentative thematic structure, which was then comprehensively reviewed together with EP before collaboratively determining a thematic structure that best captured young people's experiences. A comprehensive summary of the themes and supporting evidence from transcripts is summarised in Supplementary Material 2.

Community involvement statement

Community members were not involved in the design or implementation of the study, or in the analysis or interpretation of the results.

Results

Our reflexive thematic analysis of autistic young people's responses identified four overarching themes regarding the use of virtual reality (VR) for social interaction, including both the perceived benefits and limitations of VR. This included that VR can support social communication and understanding by controlling or augmenting sensory inputs (Theme 1); VR is 'less scary' and makes me 'more confident', by controlling the social outputs during the interaction (Theme 2); VR offers new and 'fun' social possibilities (Theme 3); and VR is 'just not the same as seeing someone in real life' (Theme 4; see Figure 2).

In our comprehensive summary of evidence for this Reflexive Thematic Analysis (Supplementary Material 2), we qualified whether participants were interviewed before or after the onset of COVID-19 lockdowns. This was done retrospectively to examine whether the social isolation experiences of lockdown had any impact on the perspectives of young people towards social VR. There were no meaningful differences in the responses between those interviewed before or after COVID's onset, with almost all subthemes endorsed by young people at both time points. The only notable – although likely spurious – exceptions to this were that young people interviewed post-COVID were more likely to comment on new possibilities offered by VR (Theme 3) and associated concerns with Internet safety (Theme 4B). However, this likely reflects a spurious association, or the fact that those interviewed later were more likely to be exposed to the growing commercialisation of VR devices and artificial intelligence, than the occurrence of COVID.

Theme 1: VR controls or augments sensory inputs, supporting communication

Many young people commented on the benefits offered by VR's ability to 'block out all the noise' (subtheme 1A). They explained how VR reduce sensory overwhelm, by filtering or augmenting the sensory information conveyed to them during social interactions, thus making communication more accessible. For example, one participant shared,

> I definitely personally see the benefits. With the autism I just pick up too much of everything that is happening

> around. When I met a friend earlier today, just- I could hear, like, a baby crying, the vents going off and just all the different things, so the virtual things, obviously could be limited. (p. 313)

This same young person went on to explain that there can also be benefits in the diminished quality of social information conveyed through VR, by reducing the intensity and discomfort that can be experienced when looking at people's faces. He suggested that VR could help if it 'blurs their faces so it doesn't feel like they are looking at you'. Another young person explained: '[I would use VR for] a party. Too many people. Too much social stuff' (p. 321).

The benefits of filtering sensory information were also applied to specific social contexts. Two young people commented on the possible application to classroom contexts. One young person imagined a VR classroom where distractions could be minimised by allowing students to 'block out all the noise' and 'design the classroom how they want so they concentrate better' (p. 310). Another explained that it could reduce the social complexity of the classroom by reducing distraction from disengaged or disruptive students:

> VR could be cool for teaching 'cause [. . .] every classmate could wear VR and then the teacher could be standing there and it could be an interactive experience with people that actually wanna do [the lesson] because some people don't care, and don't want to do lessons. (p. 319)

Nevertheless, some also noted that filtering sensory information could have negative consequences on interpersonal interactions, potentially leading to social disconnection (see also Theme 4). One young person explained,

> I guess if I went to see a mate at a café and he said, 'Oh yeah, listen mate, I've got some Google glasses on and I'm sort of filtering, uh, out the café cos I don't want to be here' or something, I could be insulted if they need to use augmented reality [. . .] I wouldn't want augmented reality to become a must-have [. . .] people would no longer actually look at the real world and understand what needs changing. (p. 316)

This perspective further highlights the possible concern that VR as a solution to autistic communication needs might detract from broader, societal efforts – including those by non-autistic people – to break down barriers in the real world that could lead to better social outcomes. That said, young people also explained that VR could 'help you understand other people and what they mean' (subtheme 1B). One participant said this could be achieved if VR offered intelligent augmentation of sensory inputs:

> A device that allows you to get more meaning out of statements [. . .] something that can help make sure you're not misinterpreting [. . .] that would be something that would definitely be really helpful for social interaction. [. . .] help you understand other people and what they mean [. . .] you don't have to spend time worrying whether you've interpreted their meaning or listened to them correct. (p. 324)

Another participant suggested that it would be useful if VR displayed some aspects of people's internal thoughts or preferences, in a way that the interlocutor could control. This was prompted by the accompanying parent who said 'it would be cool if it told you when people were being sarcastic':

> Yeah, that would be good. Or if [VR] actually said what [other people] feel. And you could turn that off. [. . .] Or you could make it so they can see somethings what you are thinking, but not all of them [. . .] So, then everyone doesn't have to ask 'hey, what's your name?', they would go 'oh! That's your name', or 'oh that's what they want to be called'. (p. 310)

Theme 2: VR is 'less scary' and makes me 'more confident'

In addition to controlling sensory inputs, VR was seen to provide benefits by enabling autistic young people to control their access to social environments and how they are presented in those social environments, making social interactions feel safer and less intimidating. In particular, VR was described as 'breaking down a barrier' (subtheme 2A) for autistic people who might feel anxious or unsafe when interacting with strangers in new environments or high-stake contexts. One person reflected on how VR could help people who are anxious about dating:

> I think on a date, if some people are very nervous or insecure about themselves, or they get nervous when talking to people [. . .] if they could go on a virtual date with someone and they can just talk to each other and just find out what kind of a person they are without ever seeing each other. And then, so when they do see each other, they'll know what kind of a person they are. I think it would be great. It would be breaking down a barrier for people who don't go on a date – any dates – because they are scared of going on dates. (p. 316)

Importantly, this participant explained that while they see this possible benefit of VR in helping establish new relationships, its usefulness or their preference to interact via VR could change on 'a case-by-case basis. I think it would depend on the circumstances', including the purpose of the interaction and age of the other person. They added,

> I do think it is important to still be acquainted with people in person. I would hate to have to know someone whose only friends are people that they have met online, as much as it might be easier for them to make friends online because they can – it's very risk free, if, you know, they say the wrong thing, or if it doesn't work out they can just – you'll never see them again.

A parent who was observing their child (p. 309) interact with one of the research team in VR and then face-to-face,

explained that it offered a more comfortable first step to meeting a new person:

> I noticed that if he just met [researcher name], when he walked in the room in real-life, that he would be nervous, and have his pulse increase and everything, but when he had already met him through the AI [i.e., virtual reality] and then met him in real-life he didn't go through it. He felt like he already knew him, so he had already gone through that. We kind of completely missed that bit that we normally always have.

Young people also felt that the control and safety of VR can 'give people more confidence to become more social' (subtheme 2B). Specifically, the 'actual, like, feeling of being a different person in another world' (p. 327), to control your appearance and self-representation in VR, was seen to support feelings of safety and confidence. Another explained that being able to change your appearance 'would get rid of the stress of lots of people thinking "oh people don't like how I look" or "oh no I have curly hair what will they think?"' (p. 310).

While some acknowledged the dangers that can come from misrepresenting oneself (see Theme 4), others felt that choosing alternative appearances could enable opportunities for fostering genuine connection, because they would be judged on their personality, rather than their appearance or body movements:

> You can have more confidence [. . .] because they don't know you personally. There's, like, it sort of removes that feeling of responsibility with every action [. . .] In terms of a job interview [. . .] It would just be purely about what you're going to talk about and your personality. Um . . . so could be good because the person could get more of an idea of the person you are. (p. 324)

The same person also suggested that VR 'allows you to get things out' when talking about a 'difficult subject. It's easier to talk about that if you're not seeing them face-to-face'. Another young person felt that they would be less likely to be bullied if they could control their appearance in VR: 'If I could pick any avatar . . . no one could bully me . . . You can't get bullied' (p. 329).

Theme 3: VR offers new and 'fun' social possibilities

Virtual reality was seen by many to provide many new and exciting social opportunities, including the ability to overcome physical or distance barriers because 'you don't have to meet up somewhere' (subtheme 3A) and 'can interact with people all over the world' (p. 330). One person said that 'if another person was far away, or something, that [VR] could be a great way to connect' (p. 311); and 'if I was meeting someone who's far away, [I would] definitely [use VR]' (p. 328). VR was seen as being useful for long distance communication by offering more interactive opportunities than video-based platforms provide:

> Obviously with long distance communication, like, you can show, even if it's not a hundred percent accurate, you can show what you are doing with your hands, which gives more connectivity. (p. 313)

Similarly, another explained,

> You don't have to meet up somewhere or figure out where you're going to go. It's quicker. It's easier [. . .] you can use it for more places [. . .] it helps you extend the range of contact [. . .]it just makes it easier for long distance, like I said earlier, and I think VR is a good way to do that because it just increases that physicality and reality to the conversation [. . .] as close to a physical conversation as you can get with an online [interaction]. (p. 324)

While some young people were less convinced that VR would improve social outcomes, they nevertheless agreed that VR would 'be interesting' (p. 327). Indeed, many noted the fun and novel opportunities that can make VR 'more interesting. Funner!' (subtheme 3B):

> VR is awesome [. . .] you can play games and stuff on VR with your friends and stuff. You can meet up in different worlds. Just have a laugh and stuff. That'd be fun. (p. 328)

One young person thought VR could be used to make school and learning more fun and effective: 'If the teacher said, "Oh imagine this" . . . you can actually go there instead of just imagining and it's a lot more lifelike. And it means you can go on more excursions and stuff that help you learn [. . .] It was fun. I'd like to try other things using it' (p. 310). Similarly, others commented on the access to interesting experiences VR can offer: 'I think it's really cool [. . .] you feel like you are in a different space' (p. 317); 'It felt really good [. . .] like I'm in a CGI movie' (p. 306); and 'It's certainly a very exciting prospect of being able to look – and having just some googles on – and looking into a completely new world' (p. 316). Another elaborated that the exciting opportunities not only relate to exploring different environments but also embodying different agents or personas (related to Theme 2):

> It sort of allows you to be somewhere you're not. And to do things that maybe you wouldn't be able to [. . .] It sort of accentuates what so many people love about video games, which is, you get to control someone you're not and you get to be someone who you're not for a little bit. (p. 324)

Others mentioned they simply 'liked that it's something new' (p. 308) and would like to see the boundaries and possibilities of VR extended: 'I'd go more fantastical with it. Like . . . mystical forest or something. Not just a café' (p. 327).

Theme 4: 'It's just not the same' as seeing someone in 'real-life'

Some young people commented that VR was desirable as it can be used to avoid physical social interactions because 'I don't like socialising with people' and, because when using VR, users 'don't have to actually see the person face-to-face' (p. 318; also see p. 312). However, most young people were adamant that VR is 'just not the same' and could not replace real-life social interactions. Some expressed reservations about VR's ability to replicate the richness, authenticity and emotional depth of in-person communication with fears that VR 'takes away people's humanity . . . it's just not the same experience as seeing someone in real life' (subtheme 4A; 317).

This view was echoed by others who felt that VR interactions lacked the subtle, often non-verbal cues that are essential for understanding others. For example, a younger participant (p. 326) explained that 'real life interactions are much easier. [. . .] because you're actually seeing the person' and 'I think it's easier to see what's happening with the other person in real life' (p. 313). Another elaborated on the limitations of current VR technology:

> I feel like I definitely would have a preference for physical because it's still – the technology we have now isn't able to perfectly mimic all our movements and isn't able to – it would still seem sort of fake, I guess. Simulated. (p. 324)

Participants also noted that VR could obscure important social information. One participant said they would prefer 'real life because then it's much more interactive, um, and, like, facial expressions, and, like, yeah, social' (p. 321). Another felt that this would remove the fun derived from social interactions:

> Meeting a friend at a café . . . that's just, no. That's just lame. Or a good old party, no. Like, a party, you go there for, like, drinks and stuff and you know, to meet- actually meet people. Like, you're not gonna know what they look like or anything like that. You'd just be meeting a fake person, basically. Meet a friend? Nah. Why would I want to meet a friend in VR, you know? I want to see them, I wanna talk to them. I wanna have a laugh with them. (p. 328)

Some of these comments were directly at odds with other comments made about the benefits of reducing the intensity of social information conveyed through VR (see Theme 1). One person articulated this tension clearly: 'There's so many good things about it but [for] every good thing, there's another bad thing you have to sort of balance it out with . . . we never want to replace physical contact unless it's absolutely necessary' (p. 324).

In addition to concerns about authenticity, participants raised issues around trust, deception and 'internet safety' in virtual environments (subtheme 4B). In particular, many noted the concerns around the potential for people to misrepresent themselves in VR: 'they might fake their avatar model' (p. 327) and 'you don't know if they're a psycho murderer or not' (p. 324).

Others felt that VR can change the way people behave, including in more antisocial ways: 'people act different on virtual reality than they do in real life' (p. 328). One person talked about this concern in depth, noting how VR use has the potential to dehumanise others:

> I notice changes in how I talk and how other people talk [when online]. I guess sometimes you're more confident online because it's not face-to-face. You can say things that you maybe wouldn't otherwise say. Maybe you can be more hurtful or because it's easier if you don't see the person and see the person as they are as a human. It's easier to just sort of not think of them as a person and be like, a lot more harsh or harmful. (p. 324)

This same young person also highlighted the ethical and relational complexities of VR-mediated interaction, noting that prolonged use of VR could lead to shifts in social behaviour in physical interactions: 'it could change how you act with people in the real world as well if you spend all your time in virtual reality, you might act in a different way in real life depending on how you act virtually'. While VR was felt to offer a sense of control and safety for some, it was also perceived to introduce new vulnerabilities, particularly around identity, trust and safety.

Discussion

We explored autistic young people's experiences of social interactions in VR, and their perspectives towards its potential utility as an assistive technology for supporting social interactions. Our reflexive thematic analysis revealed that autistic young people generally found social interactions in VR to be tolerable, exciting and useful in providing a safe first step towards high-stakes interactions with strangers (e.g. first dates and job interviews). Young people felt that VR may be beneficial when meeting others for the first time, because it can mitigate sensory overwhelm, anxiety and ensure safety. Others suggested that it can provide a more interactive experience than phone- or video-based interactions when in-person interactions are not possible. Importantly, however, VR was not seen as a desirable replacement for physical social interactions. Indeed, participants expressed a clear preference for in-person interactions when building and sustaining meaningful social connections. Our findings are critical for informing future directions to the exploration and application of VR for supporting autistic people but also for reframing some critical misconceptions regarding the social interaction needs and preferences of autistic young people.

Support social interactions by providing access, control and augmentation

Participants described VR as offering a unique opportunity to scaffold social interaction by modifying the sensory and social environment. Some noted the possible integration of VR and AI, such that VR could be used to evaluate and augment social signals from others in ways that are more intuitive or obvious for the autistic interlocutor. Examples of this involved displaying the names of the other person, or to label the emotions conveyed by facial expressions. However, for many, VR was seen to support social interactions by simplifying or filtering irrelevant or overwhelming sensory information that can lead to overwhelm and confusion. These findings align with a substantial body of evidence from behavioural and lived experience research that has collectively demonstrated that the sensory sensitivities experienced by autistic people can not only be distressing but also add cognitive load that directly interferes with their capacity to engage in social interactions (MacLennan et al., 2022). Our findings also resonate with earlier research by Caruana et al. (2018) involving autistic adults who completed a screen-based virtual interaction task. Some participants in this study explained that the virtual interface helped to reduce the intensity of the social interaction, which eliminated much of the anxiety that often comes with social interactions – either because there is too much information to process at once – from the other person and the environment – or because there is an element of social anxiety concerning how one is being evaluated or judged by their social partner in physically embodied social interactions.

Relating to this latter point, autistic young people in the current study expressed that they valued the ability to manage how they were perceived by others in VR. The option to choose or modify one's avatar was seen as empowering, allowing participants to feel more confident and less vulnerable to judgement based on appearance or body language. This echoes broader findings that autistic people often experience stigma and bias in social settings, which in turn encourages camouflaging or masking strategies that can be cognitively demanding and lead to poor mental health and well-being outcomes (Cage & Troxell-Whitman, 2019; Hull et al., 2017). Indeed, research from the first impressions literature has shown that autistic people are judged more negatively than non-autistic people based on subtle differences in their speech or body movements, even when viewing video clips as short as 10 s long, and when the diagnosis of the depicted person is not disclosed (DeBrabander et al., 2019; Sasson et al., 2017). Sasson et al. specifically found that non-autistic participants rated autistic people as less attractive, likeable and trustworthy than non-autistic models. They were also less willing to engage socially with autistic people. Importantly, negative biases disappeared when participants were given transcripts of the videos without audio or video content, suggesting that judgements were influenced by the style of interaction, rather than the content of the interaction. As such, by filtering out some of the superficial non-verbal behaviours that can unduly shape negative first impressions, VR may help balance the desire for interactive and embodied communication, while mitigating the influence of irrelevant social cues that can bias interpersonal evaluations. Striking this balance is likely to be particularly consequential in social situations where first impressions matter, such as establishing an important friendship, or impressing a prospective employer.

While our study focused on autistic young people, it is important to acknowledge that many of the perceived benefits of VR were also relevant to non-autistic people. Although we did not formally analyse their responses, non-autistic people involved in the broader project expressed similar views about VR's potential to reduce apprehension and offer safe, engaging social opportunities (Caruana et al., 2023). In addition, the benefits described by autistic people in mitigating negative biases based on appearance or superficial behaviours are likely to be broadly relevant in contexts such as first dates or job interviews. Appearance-based biases – including those related to attractiveness, body shape, race, gender and height – are well-documented influences on hiring decisions and social evaluations (Hosoda et al., 2003; Quillian & Midtbøen, 2021; Voit et al., 2023). VR offers a unique opportunity to reduce the salience of these biases by enabling avatar-mediated interactions that obscure physical characteristics and behaviours such as eye contact, facial expressions or fidgeting. As such, VR may support more equitable and inclusive social outcomes across diverse populations, not only for autistic people.

One challenge in realising the potential benefit of VR – via social information attenuation – is identifying what specific aspects of social behaviour should be accurately displayed in VR, and which should be removed or augmented. This is particularly pertinent given that many interviewees equally stressed VR's benefit in being able to veridically depict non-verbal behaviours, with some stating the loss of non-verbal information was disarming and could make it difficult to understand others. Future work that systematically manipulates the role that different channels of social information offer in virtual interactions (e.g. speech, eye gaze, hand gesture, head orientation, posture) could help inform a hierarchy of social communication capabilities in VR that can be optionally turned on or off depending on the context of application, and needs or preferences of the user. One of the key capabilities of VR is its capacity to support synchronous, yet asymmetrical, social experiences between two interacting people. That is, it is possible that two people interacting in VR can be shown different virtual realities. This could include different lighting experiences; different relative

proximities to their virtual partner (i.e. how close they appear to be to each other); different environmental scenes; different avatars seen to depict themselves or others; and they may even be shown different channels of social information (e.g. only one person may see the eye and face movements of their partner). Understanding the consequences of such asymmetrical interactions is critical for informing whether this VR capability can be harnessed to create more accessible, safe and personalised modalities for social interaction.

A safe first step – but not a destination

VR was most positively viewed as a first step towards social interaction, particularly in contexts that might otherwise feel inaccessible – such as dating, job interviews or meeting new people. In this way, VR may serve as a transitional space, offering a low-stakes environment in which to build familiarity and confidence. This is consistent with prior work suggesting that structured environments can support autistic people in developing social connections (Müller et al., 2008). However, participants were clear that VR could not replicate the richness of in-person interaction. Many described VR as lacking the subtle non-verbal cues – such as facial expressions, tone of voice and body language – that are essential for understanding others.

The expressed resistance to VR as a replacement for in-person social interactions directly challenges stereotyped, stigmatising and neuronormative conceptualisations of autistic people as having an 'abnormal' or reduced capacity and motivation to seek and engage in social interactions (cf. Crompton et al., 2025; Davis & Crompton, 2021; Jaswal & Akhtar, 2019). Most of the autistic young people we spoke with explicitly highlighted the importance of genuine, physically embodied social interactions – when engaging with both friends and strangers. This aligns with emerging findings that access to social connections – of all kinds – are both wanted and critical for the well-being of autistic people (Pellicano & Heyworth, 2025).

Others expressed concern that VR might encourage disconnection or even dehumanisation, particularly when people behave differently or dishonestly in online virtual spaces. These concerns echo broader critiques of online and mediated communication, particularly around issues of authenticity, trust and cyberbullying (Lonergan et al., 2023; Snyder & Golladay, 2024). While these concerns apply broadly to online interactions, VR may be particularly dangerous and harmful because it enables anonymity with embodied (albeit virtual) interactions, which can make antisocial or abusive behaviour feel more present and threatening (McGlynn & Rigotti, 2025). Other young people noted concerns that the long-term use of VR for social interactions could lead to unhealthy or antisocial behaviours transferring to real-world contexts. Indeed, there are growing concerns that long-term engagement in the 'metaverse' (i.e. online virtual environments) may lead to dissociation with real-world norms and rules – which are also difficult to police when violated (Benjamins et al., 2023). However, such concerns were only considered if VR were to regularly replace in-person social interactions and would be mitigated if only used 'when necessary'.

Limitations and future directions

There are several limitations to this work. First, this study focused on the views and experiences of autistic young people without intellectual disability. Future research should therefore examine whether autistic people with different support needs – and of different ages – experience social VR in similar ways to the current participants. Second, it is possible that the broad conceptual landscape of 'social interactions' may have made it difficult for some participants to contextualise their thoughts about the specific application of VR. Future research should therefore also strive to gather a more in-depth understanding of the perceived benefits and limitations of this technology in particular contexts of application (e.g. for supporting first dates or job interviews). Third, the VR task that participants were exposed to was limited in that it only involved a seated non-verbal interaction, in a relatively sterile environment, which meant that it did not showcase all of the social communication capabilities that VR can offer, including the ability to navigate through virtual environments and engage in conversation. It would therefore be useful for future research to expose people to more valid VR analogues when exploring its utility in specific contexts. We also note that the capabilities of VR have already rapidly progressed in the years since the study first began just before the onset of the COVID-19 pandemic. Future work should also include an exploration of different ways of implementing and positioning VR so that feasible methods for the adoption of this support tool can be realised. For instance, when considering the use of VR in job interview contexts, it would be important to explore the possibility of asymmetrical implementation, such that the candidate may interact in VR but see a live video feed of the interviewer who need not have access to VR equipment.

Informing such design considerations should be guided by co-design approaches that centre the lived experiences of autistic people and other stakeholders at every stage of development and deployment. Our findings also highlight the need to evaluate VR tools not only for their usability or tolerability but also for their potential to support social connection, autonomy and well-being. These outcomes are more likely to be achieved through thoughtful environmental adaptation than through behavioural training.

It is also critical that co-design approaches acknowledge the likelihood that social VR applications will need to be modular and customisable – offering users control over

multiple aspects of the VR environment, avatar representation, and the degree of symmetry in their virtual experience and that of their social partner. This is particularly important given the highly context-specific evaluations of VR's perceived utility by the young people in this study.

At the same time, it should be accepted that VR may not offer meaningful value for many autistic people, or across many types of social contexts. As such, autism–VR developers and researchers must ethically communicate the promise of VR as a specific support that may only benefit some, rather than as a universal intervention modality, to avoid inadvertently misrepresenting the social capabilities, needs and preferences of autistic people in ways that may be stigmatising.

Conclusion

Our findings suggest that the promise of VR for autistic people should be reframed. Rather than viewing VR as an intervention tool that can deliver simulated social skills training, VR may be better considered as a tool for modifying the social environment in ways that align with autistic people's needs and preferences (Davis & Crompton, 2021). Autistic young people in this study viewed VR as a promising tool for supporting social interaction, particularly in contexts that are otherwise anxiety-provoking or inaccessible. They reported valuing VR for its ability to reduce sensory and social stressors, support confidence and offer novel social opportunities. However, VR was not seen as a desirable medium for long-term use or as a replacement for in-person interactions, which autistic young people emphasised are important for maintaining well-being. Our findings help reframe some of the misconceptions concerning the social needs and abilities of autistic young people, and to define the scope – and inform the development – of future VR tools that can support them to navigate important social interactions in specific contexts.

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Supplemental material

Supplemental material for this article is available online.

Note

1. Two of these participants provided reports from clinical psychologists who had administered the Autism Diagnostic Observation Schedule, Second Edition (ADOS-2). One included comparison scores for *Communication* and *Social Interaction*, which are included in the descriptive statistics reported in Table 1. The other only provided assessment results but noted that the young person met the criteria for an autism diagnosis with marked difficulties with social communication and interaction.

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