"We've All Come Together"
A Board-Gaming Approach for Working with Autistic People

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The authors discuss how board games offer individuals with autism (who often struggle with social settings and require structured outlets for building relationships) an affordable, naturalistic, collaborative environment that is stimulating, engaging, and educational. Board games, they assert, provide opportunities to practice social skills, including cooperation and social deduction, essential skills for both neurotypical and atypical people. The authors include recommendations for introducing board games into special educational settings. **Key words**: analog games; autism; board games; developmental disabilities; interpretive phenomenological analysis; social cohesion; special education; theory of mind

Introduction

Board games have been around for more than four thousand years, with evidence from at least 2500 BCE documenting the Royal Game of Ur (Finkel 2007). What we know as modern board games are distinguished by their engaging mechanics, decreased reliance on chance, increased strategy and player interactions, stronger narratives, and more intricate components (Cross et al. 2023). In the past couple of decades, modern board games have seen a huge increase in popularity. In 2017 the global board game market was worth more than $7.2 billion, and in 2020 alone, the market grew by 20 percent as the world turned to other methods of entertainment during the COVID-19 pandemic (Tighe 2022).

Board games take many forms but often have the same core principles in their design. They are played around a shared space, requiring joint attention and an acceptance of shared rules, and they involve turn taking, cooperation, and reciprocal interactions (Hofstetter 2021). Board games are designed to be

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entertaining and engaging while simultaneously building skills such as time management, strategy, cooperation, and teamwork. They may offer a more natural, cost-effective solution to common interventions to enhance cognitive and social development. For example, many modern board games have high replayability, allowing for prolonged practice and engagement (Greenwald 2022; Walton and Ingersoll 2013). Much replayability comes from the randomization inherent in modern board games, which allows for new strategies, meaning that game play time increases and players achieve better value for money spent (Hammar and Persson 2022).

The ability of board games to improve social outcomes is linked to self-determination theory. Self-determination theory promotes the psychological needs for competence, autonomy, and social relatedness (Mekler et al. 2017; Ryan and Deci 2002; Sailer and Homner 2019). Fulfillment of these needs heightens intrinsic motivation (Ryan and Deci 2002) and promotes improved learning (Ryan and Deci 2000).

Developmental Disabilities and Board Games

Developmental disabilities characterize a group of individuals who may experience physical challenges and challenges in the areas of learning, language, and behavior, resulting in a need for specialist health and education services (Boulet, Boyler, and Schieve 2009). Recent data on U.S. households suggests that 17 percent of children aged three to seventeen have a developmental disability (Zablotsky et al. 2019). Board games have been previously used to help bolster skills for autistic individuals and those with intellectual and other neurodevelopmental disabilities (Atherton and Cross 2021; Campbell 2008; Standen and Brown 2005). We use the term autistic individuals in this article because it was preferred in a recent survey of the autistic community by its thirty-five hundred participants (Kenny et al. 2016).

Board games offer advantages over traditional learning strategies because their enjoyable and stimulating nature enhances motivation and builds on success (Kang and Chang 2019). Gamified learning may be beneficial for individuals with developmental disabilities, such as autism, because the accessible nature of gaming allows activities to be completed at home or in any location without the need for trained educators and professionals (Dickinson and Place 2016). Once mastered, board games can be played independently with peers, which is

inextricably linked to improved social competence (Barton et al. 2018).

Bent and his associates (Bent et al. 2021) assessed the social skills of autistic children as they played board games with their peers, and the researchers found that as game play continued, children's social skills ratings improved over time. Similarly, teaching children board games can increase their turn-taking ability, a skill commonly targeted in children with developmental disabilities (Daubert, Hirnstein, and Tincani 2015; Rieth et al. 2013). More broadly, research shows that individuals with developmental disabilities tend to express less self-determination (Wehmeyer and Shogren 2008). As such, they can have less independence and autonomy (Vicente et al. 2020). Because independence is vital to an individual's quality of life, employment options, personal relationships, and living outcomes, finding a way to increase self-determination in people with developmental disabilities is essential (Kim 2019; Lachapelle et al. 2005; White, Flanagan, and Nadig 2018). The constant feedback that board game playing provides proves one of the most potent factors in learning and educational interventions (Hattie and Timperley 2007). Therefore, self-determination and independence can be improved by gamifying intervention techniques.

Board Games and Theory of Mind

Many board games employ mechanics that may represent areas often used in interventions for people with disabilities. For instance, one of the most prolific areas of autism research in the last several decades has focused on understanding how people with developmental conditions like autism vary from neurotypicals in their theory of mind abilities, an umbrella term used to denote the talent to decipher and predict what other people are thinking (Baron-Cohen et al. 1985). This area of research suggests that some autistic people may have differences in the way they decode facial emotional expressions (Trevisan and Birmingham 2016; Atherton and Cross 2022), understand implicit cues like body language and tone of voice (Kleinman, Marciano, and Ault 2001), and take other people's perspectives (Atherton and Cross 2019). And they may be more focused in general on nonsocial rather than social information in an environment (Frazier et al. 2017).

Many of these theory of mind skills are implicated in board games, such as social deception and clue giving. In playing these games, players must use aspects of theory of mind, perspective taking, and social cognition to work out whether

other players are bluffing or concealing their intentions (Oey, Schachner, and Vul 2019), or what element of a clue is most relevant to all players (Wilson and Sperber 2004). More broadly, in all games, players must think about the intentions of their opponents to predict their next move or, if playing cooperatively, think about how to come to a mutual understanding with their team mates (Sally and Hill 2006). Thus, all board games involve some degree of theory of mind.

Although some of these aspects of game play have been shown to prove challenging for some autistic players (Sally and Hill 2006), there are also aspects of board games that would represent autistic strengths. Autistic people are particularly well suited for structured activities with clear objectives and rules (Baron-Cohen et al. 2009). They are also shown to benefit from more predictable activities that can be repeated (Goris et al. 2020). Board games align well with these criteria: they have set rules, including detailed rule books that can be referred to throughout the game (which also means no surprises), and they can often be replayed multiple times (allowing for improvement over time) (Tekinbas and Zimmerman 2003). While the exact turn of events within a game may be unpredictable, the game session itself follows a predictable system (Adams and Dormans 2012). Game mechanics are often shared among many games (deck building, dice rolling, worker placement, role playing, bluffing), enhancing this sense of familiarity. It may not be surprising then that the prevalence of autistic individuals involved in the hobby of board gaming is much greater than that seen in the general population (Cross et al. 2023), and autistic traits are signficantly higher among board gamers than in the general population. Cross and his associates showed that not only are autstic board gamers more invovled in the hobby but that tabletop games serve as an important social outlet for some autistic individuals, offering a clear and stuructured set of rules and affording an alternative vehicle for socializsation particularly well suited to them (Cross et al., forthcoming).

Given that board games may represent an area of both challenge and strength for autistic individuals, it was of interest to see how board games, particularly those that use theory of mind, perspective taking, and social deception—areas of possible challenge—could be helpful to this population. More broadly, all games require social skills such as cooperation, sportsmanship, and joint attention, because they require people to consider how their reactions to game events make others feel. For this reason, researchers have found that board games have emotional benefits, such as enhancing relationships between couples (Melton, Larson, and Boccia 2019). Given that autistic individuals often

experience more loneliness and have smaller friendship circles—and given that this can be improved through social-group interventions (Grace 2022)—board games may serve as an essential social outlet.

With these findings in mind, this article explores the outcome of two board-gaming interventions for autistic children (study 1) and adults with autism and other developmental disabilities (study 2). Two groups of fifteen to twenty individuals—one group of secondary school-aged children, in study 1, and one group of adults, in study 2—took part in board game play once a week over one year. All players had a diagnosis of autism, and some had other other comorbid conditions (including intellectual disability, Down's syndrome, ADHD, and others; more details on samples are given in the relevant methods sections). Each group played various, commercially available board games (Codenames, Cash 'N Guns, Dixit, Deception: Murder in Hong Kong, Cockroach Poker, Spyfall, One Night Ultimate Werewolf, and One Night Ultimate SuperHeroes) weekly for around 90 to 120 minutes. Following game play, participants and staff were interviewed in focus groups about their experiences to explore how people with neurodevelopmental conditions may best use board games. Therefore, this study aimed to pilot and evaluate a novel, cost-effective examination of whether board games can affect social skills and relationships among autistic people and those with other developmental disabilities. The research question addressed whether board games affect social relationships and whether board games might help individuals with autism and other developmental disabilities.

Because this was an exploratory study, we used a qualitative methodology, employing interpretative phenomenological analysis (IPA) to investigate the lived experiences of the individuals engaging in a board game intervention. IPA is primarily concerned with exploring the details of individuals and their lived experiences and aims to offer insight into how these individuals feel in a given situation (Willig and Stainton-Rogers 2017). IPA is an idiographic, or in-depth, approach to thematic analysis that stands in contrast to a nomothetic approach, which typically deals with large samples and tries to identify universal aspects of the groups or cases (Smith et al. 2008). The thrust of IPA centers on a desire to understand an individual's unique lived experience to reveal new insights and determine how the environment affects the individual (MacLeod 2019). This exploration often involves using the participant's everyday language to discuss and name themes and codes rather than using overly academic speech in the analysis and presentation of interview themes (Tuffour 2017). IPA was chosen for this study because it attempts to understand in depth the participant's experience

and existential aspects of living with autism, including more complex questions concerning how board games more broadly affect players' self-concepts and their relationships with others.

Methods of Study 1

Fifteen autistic children, ten males and five females, ten- to fifteen-years-old, participated in this study. They attended a special educational school specifically for children diagnosed with autism in the Liverpool area in the United Kingdom. Board games were played with two classes within the school, a younger class (n=7, aged ten to twelve) and an older class (n=8, aged thirteen to fifteen). Six staff members at the school were present throughout the game-playing intervention and participated in a separate focus group at the end of the intervention, resulting in twenty-one people being interviewed in total (fifteen children and six adult staff). Children were interviewed in their respective groups, totalling three focus groups, two with children and one with staff. An introductory session was held to explain the research project to the participants. Project personnel obtained parental consent and child assent for all individuals who wished to participate. Edge Hill University's ethics review board granted full ethical approval for the project.

Over one school year, participants played various commercially available games once a week (during school term times). Games played were Dixit (a picture clue-giving game), Codenames (a team-based, word, and clue-giving game), Cockroach Poker (a picture-based, bluffing game), Cash 'N Guns, One Night Ultimate, Spyfall, and Deception: Murder in Hong Kong. (The last five are all social deception games, meaning games that try to trick other players and hide one's identity). Sessions were run in parallel with two classrooms, a younger (ten- to twelve-year-old) and an older (thirteen- to fifteen-year-old) cohort. Sessions lasted around ninety minutes, and children chose which games to play in a given week. Following this year-long intervention, focus groups were conducted separately for each class and all members of staff involved.

Examples of the questions asked in the focus groups included: "Can you talk about your (or your students') overall experience while playing the board games?" "Have you noticed any changes in yourself (or your students) since you started playing the game?" "How have your (or your students') relationships changed since playing the board games?" "What was your favourite game and

why?" These questions aimed to get the participants and staff talking about their experience participating in this intervention to determine its benefits. Data was analyzed using IPA as previously mentioned.

Results for Study 1

Two coders independently reviewed the focus group transcripts. They identified a list of subthemes for the three separate groups (children in the younger class, children in the older class, and teachers) before combining them into a master list of themes present for all groups using the process detailed in Graneheim and Lundman (2004). This process focuses on analyzing the explicit content of the text and the researchers' interpretations of the text. It is conducted using the following five steps: First, read and reread the text to become familiar with and gain a general understanding of the content. Second, divide the text (interview transcript) into "meaning units." These are "a constellation of words or statements that relate to the same central meaning." These can take the form of short or long segments of text and quotes. Third, condense these further while ensuring they all have the same core meaning. Fourth, label these condensed meaning units by creating a code that groups the units into categories. And fifth, identify categories or themes. Categories answer the question of "what?" and themes answer the question of "how?"

Themes are defined as recurring regularly within a category that creates links between the meaning units. These are more appropriate for this study because they offer a greater understanding of the ideas discussed during the focus groups.

Coders convened after these steps and consensually agreed on the overarching themes across the three data sets, as done by Atherton and her associates (Atherton et al. 2018). The three main themes were social deception games, social growth, and escapism.

Social Deception Games: Lying

The children were most excited about playing the games that involved deception. They discussed the mastery they achieved when successfully deceiving other players and how the somewhat subversive themes (heroes versus supervillains, werewolves versus villagers) piqued their interest and kept them engaged. "The game I enjoyed most is probably One Night. I liked that one," said one child who

found that "it's fun to, like, play heroes versus villains in, like, a card game." Participants connected this to other games they had played and enjoyed, remarking that "it's, like, Among Us but as you know, every role has a different meaning, and then you get to vote someone out who you think is the villain."

Participants were keen to express the tactics they used to succeed in these games. They often discussed having to "lie" or "just be really awkward so the other person can't see what you're doing." They said that when it came to finding the villains, it was easy to tell by "the fear in their eyes" or "their faces as well" and that those who did not have an influential role in the game, such as the bystanders, "just stick with the same strategy over and over." However, those with more important roles had to change their tactics to trick their competitors: "I usually try and change my methods a lot, because if I carry on doing the same thing, it gets quite predictable, so I do try to change up what I do, and I guess that's enough of a trick."

The use of tricking while playing the games, such as One Night, was common. Participants expressed that "your brain is trying to trick other brains pretty much," and they tried to "emotionally manipulate those I hold closest." This use of the theory of mind skills suggests that these board games tap into the area of cognitive development involving perspective taking and that it can be enjoyable for autistic players, perhaps particularly those who are introduced to the game at a young age and who can play with other autistic players.

Not only did the participants enjoy the social deception element of this intervention, the teachers also noticed that there was a positive outcome to their playing these games: "I think that it worked out really well, and actually [the fact] that they have been practicing lying is quite good actually, because they are not the best at lying. Not that we like it, but in life you do need to be able to do it."

Overall, participants reported enjoying the social deception games. They learned how to lie and how to detect lies, a valuable life skill that can prevent manipulation and help with social relationships, strengthening them or assisting participants in forming new ones. Teachers noticed the improvements and noted the need for such skills.

Social Growth

Both the students and their teachers reflected that the board games allowed the students to "come together more," because they "have to work together" and that this "has brought us closer." Because the board games were interactive and required teamwork skills at points, the children had to work together and com-

municate with peers to whom they were not typically very close. The teachers noticed that "now they could sit together and do a task together as a class. Now, if we have a group task, or even bringing them onto the carpet, they'll actually choose to sit closer and engage and interact with each other a lot more, which is nice."

This increased closeness was connected to the games because "it was probably about the joining together and doing something where they've all got a part to play in it, too, to make something happen. That has helped a lot." The cooperative nature of board games, including the physicality of coming together around a board or a deck of cards, increased the physical and emotional closeness between classmates outside the game sessions.

The students also said that their relationships with each other improved throughout the intervention: "The longer you play it, the more friends you're going to have because you're going to trust each other even more." The students linked this with having "more conversations" with each other and having "sat round the table together." This "bled" over into other areas of their lives: "We've been doing a lot of, like, group work over the last two weeks, especially, and this class has been doing really well since playing the board games."

The teachers were surprised to see that, despite these students typically struggling with new experiences and new people, they took well to having new people in the classroom to run the gaming sessions. This may have contributed to the success of the intervention. The teachers noticed that the students liked having "new people coming in to do that, as well as maybe different people. If we [the teachers] had got a game out, it wouldn't have gone over as well, it maybe wouldn't have worked."

Further, the classes enjoyed seeing and interacting with classmates they did not usually see: "I like that [name of child] gets to come down for a bit." Because the games were accessible and interactive, they allowed the children to develop social relationships with children who were not already their friends. This newfound closeness to their peers let the participants develop better friendships. This may have been partly due to the transcendent nature of board games, which take players out of the ordinary and foster role playing and escapism.

Escapism

Students felt that games gave them a welcome respite from typical classroom activities. Though the games provided skill building, these were not done rotely through instruction or a structured intervention but almost imperceptibly

through play. In this way, participants expressed that playing these games provided a break from the monotony of their regular school day: "I just get a break, well, all of us get a break from doing work that we never get a break from" and so the games "keep us calm." This change from usual educational activities was received well, "unlike actually having to, like, sit there and write for forever, like actually using my brain." This provided the students with a "brain break" though the games were still stimulating, but in a different way: "Games are just more fun than sitting at my desk and doing work until my hands eventually wither away."

This escape from tedium through the games appeared common. Participants often expressed that they "just liked the fun we had" and "they were rather enjoyable." Even the teachers noticed that enjoyment played a key part in the high engagement inherent to the intervention: "If you bring humor into it, they will all get involved more. If it's funny, they just have a laugh with each other, and that always works better. If you can make them laugh, they stay focused."

The teachers also expressed that picture-based games, such as Dixit and Werewolf, were "accessible to all of the children, even if they couldn't necessarily read." Thus, all the participants enjoyed the experience.

Social deception games also motivated students to overcome their issues with control because game play requires reciprocity, turn taking, and shared decision making. Often they found it not actually a good strategy to speak too much since doing so revealed one as "the traitor." In this sense, the intervention stretched students who had control issues to relinquish their control to win the game: "There's a big issue with control, a lot of them wanting to be the one who goes first or tries to take control over games. They really struggled with that. However, as the weeks have gone on, they've learnt that it changes and they don't necessarily need to be the first one to speak because it doesn't determine the outcome of the game."

Another outcome of this intervention was that the teachers found participants enjoyed improvements in metacognition and education: "I think that's impacted on my English lessons as well. It's obviously opening them up to thinking about words that are related to them, to that one thing and not just that one word. . . . From an English point of view, this was really good for me." It was also apparent that playing these games had helped the participants learn new skills. "They've done a lot better with turn taking and things like that," noted one teacher, something which may have surprised them. "I didn't think they would take to board games like they have." Although the journey may not have been smooth, "if you give them a new game, then they've got to

learn the rules all over again and then it's basically starting again." The participants seemed to handle it all extremely well: "They have gotten very good at explaining why something's annoyed them or why something's an issue."

Discussion about Study 1

Student and teacher comments highlighted some key themes that shed light on how board games help affect various outcomes for autistic students in special education. One of the findings was that students improved their social relationships through play. This outcome is particularly important for autistic children, who experience greater loneliness and social isolation from peers than neurotypical children (Kasari and Sterling 2013). Importantly, social differences that contribute to isolation in autistic children have been linked to issues with theory of mind, which include social differences involving challenges with understanding other individual's thinking patterns (Pedreño et al. 2017) and how to act on this information effectively (Mazza et al. 2017). Both students and teachers reported that game play improved these skills. This improvement likely occurred at both cognitive and emotional levels. Social deception games played, such as Werewolf, Dixit, and Spyfall, involved the students in tricking other players or finding the trickster. To do so, students had to conceal their intentions and read the expressions and body language of others to understand whether they, too, were concealing their intentions.

Historically, research suggests that autistic individuals may struggle with these skills (Happé and Ronald 2008), particularly deception (Frith 1994; Sodian and Frith 1992). However, more contemporary research suggests that this struggle may not come from being unable to understand or engage in trickery and deception but, instead, from a penchant for honesty that drives autistic individuals (Atherton et al. 2018). It appeared that when presented in a game format, students were entertained by the somewhat subversive themes of the game (tricking others, assuming a villainous role), which motivated them to master deception skills. Games that encourage a safe practice of such skills may benefit autistic individuals who otherwise may need more direct instruction regarding deception (Ranick et al. 2013).

Secondly, the students in this study particularly improved in their relationships with other students in the class. This may have been linked to the reciprocity inherent to board game play. Within a game, despite being competi-

tive, players all have to agree on the rules of the game, take and pass turns, and center their attention on a shared space. Aspects of these actions are difficult for autistic individuals, including joint attention (Charman 2003), reciprocal social interactions (Ochi et al. 2019) and sportsmanship (Glugatch, Machalicek, and Knutson 2021). However, it is necessary to practice all of these skills when playing a game. Both teachers and students reported that, not only did the playing of board games improve relationships within the game, these relationships also led to improvements in other aspects of life, including during classroom interactions. One of the mechanisms for this may have been the novelty and escapism that the games afforded students. They reported feeling that the games offered a respite from everyday classroom activities that were intellectually challenging and stressful. They viewed games, in contrast, as a fun break from lessons, and perhaps the games motivated students to bolster certain skills, which led to a transference of these skills into their everyday lives.

To explore whether these activities can have similar effects on the lives of older autistic adults in nonschool settings, we replicated this study with a group of autistic adults with co-occurring disabilities at an adult community group facility.

Methods of Study 2

In total, nineteen participants, six males and thirteen females, all aged between twenty-one and sixty-one (M = 35, SD = 12.44), took part in the study. These participants attended a community center for individuals with autism and other developmental disabilities in the Greater Manchester area of the United Kingdom. All participants had a diagnosis of autism (or suspected autism, n=4). Five also had intellectual disability, four had Down's syndrome, two had cerebral palsy, and one had hydrocephalus. Four members of the staff were present throughout the intervention, and they also partook in a separate focus group. The center aimed to help its "service users gain the skills, knowledge, and experience they need to progress in life and work." Typical activities at the center included Wii-Fit, cooking, arts and crafts, gardening, singing, days out, and bingo.

Before data collection, we held an introductory session to inform the participants about this research project, and then we asked for their consent. There were no rewards or incentives for those who took part. Once the intervention finished, the games were left with the center for continued use, and all partici-

pants were provided a meal after the final session. Edge Hill University's ethics review board granted full ethical approval.

Once a week, for twelve weeks, for about two hours per session, participants played various games from study one. Although multiple games were piloted (Codenames, One Night, Spyfall), the memory aspects of the games proved difficult for many participants. As a result, the game Dixit became a preferred and common choice we used in the majority of sessions. Twelve to sixteen participants attended each session. In the final session, focus groups were conducted. These were composed of several smaller groups to allow everyone a chance to speak. Examples of the questions included: "Can you talk about your overall experience while playing the board games?" "Have you noticed any changes in yourself since you started playing the game?" "Have your relationships changed since playing the board games?" IPA was used again to analyze the data, as we did in study 1.

Results for Study 2

During the analysis, several themes were identified, including: "we've all come together," "learning and adapting," and "independence."

We've All Come Together

The main change apparent throughout the focus groups was a shift from groups at separate tables to one whole group together. "I feel like we've all come together," noted one participant. "We all have a laugh and everyone in the group, we all have a laugh about it. . . . It's changed because we are more together and sat around the game and have a laugh."

Many participants said that playing board games as one big group allowed them to enjoy their time more because they "all have a laugh about it." By having smaller groups known to get along, staff could reduce tensions. "We used to get a few arguments," one member of the staff said, recalling the conflicts that would take place before the intervention, thus leading to separating some participants at the start of game play. However, when the participants were seated at separate tables, the staff recalled, "It didn't go very well because the one group could feel quite left out." The game Dixit subsequently brought the players around one table, and the enjoyment of the game reduced intergroup tensions.

The social relationships within the group were seen to have strengthened as

a result of playing games. As one respondent said, "Let's just say that this group is like my brothers and sisters now. So, yeah. Let's just say we play the games like a family now." This encapsulates the overall feeling throughout the intervention. Many participants expressed that coming together as a group brought everyone closer. As one said, "Because I was new, I didn't have a lot of friends, and now I have more friends here than I do at home. . . . I do know that I feel like I have made better friends since the start. . . . I see it this way, at the start, the only friends I had were [X and Y]. Now everybody in this group I would class as friends."

The members of staff at the center also noticed this change in social dynamics. The relationship between staff and client created a safe and enjoyable environment. One staff noted: "We've had a few that talk for others and stuff like that, but even them that are quiet have been a bit more open, you know. They are talking to us and stuff like that. They always talk to us, but getting whatever's on their chest sometimes takes a while."

Group members commonly expressed that they "learnt how to help each other" through playing these games, because they had to remind each other of the game instructions and the clues given. As a group member explained, "We are all working in groups and thinking about one another, reading questions and not all being separate," and "we all help each other with the game." This in many ways spoke to the reciprocity inherent in board games, even if they include competitive, individual goals. Without a group effort, and an equal playing field among players, no one can really win.

Learning and Adapting

The staff said that the participants struggled most with "remembering what the card is." However, participants reported that the games helped "improve your memory.You've got to need to remember that when you play most of the game here, it's helping you improve your memory. It's got you thinking differently to how you do, and you've got to memorize what people said and put down."

Many of the participants were diagnosed with other intellectual and developmental disabilities along with autism, and this posed some physical challenges, particularly for those with cerebral palsy. "She struggles to hold her cards.… She's putting them down and then she struggles to put them back up, and even just looking through the cards." The physicality of playing was a challenge for some participants, but it also encouraged participants to devise their own strategies for holding cards or moving pieces. As one member of the staff noted, "As

a helper, if you are trying to help so many people, trying to remember that one person's card when you are also trying to remember someone else's, it obviously causes a bit, it ruins the game because you can't remember which card is theirs."

Over time, memory issues were reduced as the games were replayed, because participants became more accustomed to the rules. Both participants and staff commented that they surprised themselves with the level of enjoyment in the game, stating that it was "really excellent, and they are fun to play." This was a general consensus among most participants: "I thought the games were really good." The enjoyment of the game play made the proceedings run more smoothly as participants were repeatedly engaged in the activity.

Independence

The final theme from these focus groups was increased independence. Staff, for instance, said that the players "forgot that they are actually capable of doing stuff on their own." Before the intervention, staff customarily offered considerable support to their clients. But, through playing the games, participants seemed to take "a lot more on board themselves," showing less reliance on their support team. Further, the staff expressed surprise at how much the participants enjoyed the games. They stated that the players "really took it well," suggesting that, over time and with practice, adults with profound developmental disabilities successfully understood and mastered these games.

Staff frequently reported that participants showcased increased choice, expression, and autonomy after the intervention. As one noted, "To other people, it might sound a bit silly that just a game has done that, but it has. It's made them think about their own decisions, and I think, you know, because you've said 'no that's your choice, you've got to make that choice' I think they've thought, 'Right, well I can do that in other stuff as well.'"

This increased autonomy became manifest as participants began to express their opinions about the activities in which they were involved, saying, "'No we don't want to do that, we want to do what we want to do.' They actually tell us what they want to do now." This was a significant area of progress, because before the intervention, staff decided the activities almost exclusively.

Discussion about Study 2

Participants in the adult study said that they had experienced an increase in

friendships, cognitive skills, and independence. Generally, peer-mediated interventions have been shown to increase social behavior and friendships among peers (Moore and Carey 2005). A systematic review of group social skills interventions found that they effectively increase social knowledge, understanding, and functioning; decrease feelings of loneliness; and alleviate comorbid psychiatric symptoms for autistic adults specifically (Spain and Blainey 2015). Indeed, autistic adults face increasing isolation as they age, with increased loneliness and decreased quality of life compared to the experiences of neurotypicals (Atherton et al. 2021). The community building inherent to this intervention highlights the importance of games in adult community centers for players with developmental disabilities.

While the adults in the study echoed many of the same sentiments and themes as the children in study 1, there was a notable difference concerning cognitive ability, which limited the range of games that participants could play. The adults who participated in study 2 had a range of comorbid disorders and largely displayed more pronounced needs than the children in study 1. As a result, many of the games used in study 1 proved too difficult for a majority of the individuals in study 2. This included, for example, memory issues concerning looking at one's character card at the beginning of Werewolf and then remembering it by the end of the round, or a more limited vocabulary that made it difficult to find suitable clues for Codenames. The game Dixit, however, proved both a popular and suitable choice.

Previous research has found that Dixit increased the development of problem-solving skills and increased loading on executive functions (Al Mutairi 2015; Sousa 2020). Within this study, participants often expressed that they faced challenges when learning to play as they struggled to remember their cards and game rules. An explanation for this lies within the working memory model, where the phonological loop seems to be less preserved (Lifshitz, Kilberg, and Vakil 2016), and individuals with developmental delays rehearse less frequently (Rosenquist, Connors, and Roskos-Zwoldsen 2003), which has been shown to lead to short-term memory deficits (Jarrold, Baddeley, and Phillips 1999). Notably, participants and staff in our study reported that over time the repeated practice of the game and the internalization of the rules decreased these challenges. Future research may want to explore quantitatively how cognitive functions relating to memory may improve due to board game play in adults with developmental disabilities.

Improving cognitive functioning in adults with developmental disabilities

is essential for several reasons. First, improving cognitive functioning through recreation allows better integration into the community and increased independence (Merrells, Buchanan, and Waters 2018). This is important not only for self-esteem and self-efficacy but also for parents and support staff who may be detrimentally overprotective (Callus et al. 2019). The urge to overprotect adults with disabilities constitutes a common dilemma within the health and social sector that places high demands on care givers. Short staffing and a lack of staff support can lead to high levels of burnout within this profession (Howard, Rose, and Levenson 2009; Mutkins, Brown, and Thorsteinsson 2011). Furthermore, in 2021, the social care staff turnover rate was 29 percent, highlighting the need for the support profession to achieve optimum staff levels to reduce further burnout (McKenzie et al. 2021).

Games may help build independence and cognitive enhancements, which is beneficial for various stakeholders. In all focus groups, participants said they felt they had increased their independence. The challenges previously mentioned may have been overcome because of this newfound independence, resulting in less reliance on support staff, reducing staff stress, and allowing for better relationships between staff and clients. Previous studies have attempted to increase the independence of individuals with developmental disabilities; however, some difficulties were experienced, such as staff's lack of time and participants' self-regulation difficulties (Sandjojo et al. 2019). Independent living for individuals with developmental disabilities does create some barriers, such as the reliance on family and support staff caused by deficits in functional life skills (Bridges et al. 2019). This study showcases an increase in independence, observed by the participants and their support staff through an easy-to-implement, affordable, and accessible intervention.

General Discussion

The two studies, both of which examined the potential effects of board gaming for individuals with autism—first with autistic children in a special education school and second with a group of adults with autism and a range of other developmental disabilities in an adult community group—show that board game interventions enhance the development of participants in several key areas. We now discuss these effects and future directions for programs of this type.

We found that one of the most significant effects of the intervention, as

recounted by the participants and staff in both studies, was the increase in social connectedness the games afforded. By their very nature, games require cooperation and shared dependency on the moves of other players to advance game play and foster entertainment (McCain 2008). It was clear that this cohesion among group members led to stronger friendships and instances of camaraderie than had previously been experienced in these settings. Because people with autism often have challenges forming friendships and often experience isolation, providing opportunities for structured collaboration in small group settings could be a vital way to improve social well-being.

Another benefit of board games was that they built on the cognitive skills inherent in game play. These included improved memory, inhibition, and organization. Teachers at the special educational school reported that their students were less likely to follow directions or adhere to a system of rules before the games. However, being motivated to advance game play—which required joint attention, collaboration, and self-control—improved similar behaviors in other settings. Similarly, staff at the adult community center reported that, although games like Dixit initially challenged players' memory skills, participants over time improved in their ability to remember the rules and their cards and in their overall ability to win the game.

Board games have been studied in neurotypical child populations with evidence that games enhance cognitive skills such as long-term planning, organization, memory, and other cognitive processes that support strategizing (Gashaj et al. 2021). Despite the fact that these skills often develop differently in autistic individuals and those with other disabilities (Demetriou et al. 2018), less research exists on how games can support the executive and intellectual functions of people with neurodiverse conditions. This article suggests that board games may improve cognitive processes, even in adults with significant functional challenges and children with significant behavioral challenges.

Finally, this study shows that confidence in playing these games can lead to increased independence beyond game playing. This was perhaps most pronounced in the group of adults with developmental disabilities. Because this is a group of individuals with reduced independence, it is common to see a high degree of overfunctioning or compensation for deficits through increased help by staff and parents (Callus et al, 2019). Interestingly, it appeared that the board game intervention affected such compensation by changing the mindset of both participants and staff. Participants, through making choices in the game and experiencing success, were empowered to make choices in their own lives to an

increasing degree. Staff saw first hand that individuals were capable of rather complex game play, which encouraged them to think of their clients as capable of more demanding tasks than they had previously imagined.

One of the strengths of this study in particular was not only that it showed the benefit of board game play in the lives of autistic individuals, but that these improvements were expressed by participants in their own words. Historically, research on developmental disabilities and research on individuals with high functional needs have focused on delineating between neurotypical and atypical behaviors and abilities through standardized testing. In this same vein, intervention research has relied on cognitive tasks or survey measures to show changes from before and after interventions in areas that are presumed to be "lacking" or in need of improvement in autistic people, with the goal to "fix" these individuals and bring them in line with neurotypicals. Less research has examined the effects of interventions from the perspective of the individuals experiencing them, particularly when these individuals might have special needs. These two studies, in contrast, have focused on the lived experiences of participants and allowed their voices to express how board gaming may be beneficial. This is particularly important with regard to double empathy and the need to understand neurodivergent perspectives, not just to expect neurodivergent individuals to try and see the world through a neurotypical lens (Milton 2012).

There are several recommendations for stakeholders that have come out of this research. First, it is clear that the games were motivating and that the social camaraderie accompanying games improved over time. We suggest starting with a game like Dixit to introduce groups to board game play in general. Depending on the degree of developmental delay, it may be that more simple yet still rewarding games like Dixit are continually played and practiced. However, some groups will be able to progress to more challenging and socially complex games that include bluffing and deception. Cross and his associates (Cross et al. 2023) offer an open-access dataset of over sixteen hundred board gamer demographics including mental health variables along with in-game motivations and preferences that would be of use to clinicians and educators when choosing or tailoring games to specific populations. At first, staff may have to be quite involved in game play, because there are challenges to learning the game rules and feeling confident in making independent game choices. Over time, however, participants will be able to play the games independently, and this peer contact is perhaps the most critical aspect of the interventions. As with all things, interventions are a process, but the process can be rewarding.

Perhaps the biggest strength of board game play for neurodiverse people lies in the implicitly rewarding, strengths-based approach. Unlike traditional social-skills interventions, this study introduces an inherently engaging, peer-driven approach that allows neurodiverse players to connect to others and practice certain cognitive and social skills in ways that feel authentic.

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