

Investigating “social time” in autism to develop a smartphone app: a co-produced consultation with specialist psychologists and psychotherapists

Investigating
“social time” in
autism

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Received 27 February 2024
Revised 27 February 2024
Accepted 27 February 2024

Abstract

Purpose – Although increased social time is associated with healthier lifestyles, autistic people often present in therapy with social time difficulties. Given the growing interest in digital interventions and their applicability for autistic individuals, a social time app could be beneficial to support autistic people to manage social time, but there is limited research in this field, especially that which involves people with lived experience. The purpose of this study was to use co-production to conduct consultations with expert clinicians about the relationship between autism and social time, and the future development of a smartphone app to monitor and support social time in autistic people.

Design/methodology/approach – A qualitative methodology investigated clinicians’ views on the relationship between autism and social time and potential development of a social time app. Clinicians ($N = 8$) participated in semi-structured interviews facilitated by a researcher with lived experience of autism.

Findings – Participants were psychologists and psychotherapists from a specialist autism service. Thematic analysis identified factors associated with social time, such as differences with neurotypical populations, need for balance with non-social time and gender differences. According to participants, advantages of social time were connecting with people and forming relationships, whereas challenges were limited social skills, anxiety and anger and frustration. Suggested features of an app were a user-friendly design, psychoeducational components and prompts and reminders. Potential advantages of the app were support outside of therapy, support in therapy and monitoring emotional responses, whereas challenges were task completion and personalising content.

Originality/value – Findings reinforce the importance of a balance between social and non-social time for autistic people, which could be monitored and supported using a social time app. Clinicians could incorporate use of this app within psychological therapies to support emotional regulation and general functioning.

Keywords ASD, Neurodiversity, Neurodevelopmental disorders, Lived experience, Digital mental health, Healthtech, Internet interventions, Technology, Telemental health, eHealth, mHealth, Qualitative research

Paper type Research paper

The authors thank the participants for their involvement in this study.

Author confirmation/contribution statement: Simon Riches, Neil Hammond, Marilla Bianco and James Acland conceived the concept and the design of the study. Marilla Bianco conducted the data collection under the supervision of James Acland, Simon Riches and Neil Hammond. Simon Riches, Marilla Bianco, Carolina Fialho, Sarah L. Nicholson and James Acland conducted the analysis. Simon Riches, Marilla Bianco, Carolina Fialho and Sarah L. Nicholson led on writing the manuscript. All authors contributed to and approved the final manuscript.

Conflict of interest statement: There were no conflicts of interest.

Funding statement: There was no funding for this study.



Introduction

Autistic individuals often experience difficulty with social interactions and communication, which affects employment and relationships with friends and family (Girardi *et al.*, 2021; Happé and Frith, 2020; Hendricks, 2010). Therapeutic approaches targeting social skills in autistic individuals indicate that increased social time is positively correlated with healthier lifestyles but novel approaches are needed to address this challenging area (Tobin *et al.*, 2014; Spain and Blainey, 2015). Studies on the relationship between autism and technology suggest that autistic people prefer technology-based interventions, such as apps and computer-based programmes, as they are more structured and predictable (Frauenberger, 2015). Technology-based therapeutic approaches have been developed to enhance social skills in autistic individuals, including facial and emotional recognition, communication skills and prosocial behaviour (Lee *et al.*, 2018; Trepagnier *et al.*, 2011; Miller and Bugnariu, 2016; Ramdoss *et al.*, 2012). Many smartphone apps for autism are designed for children or young people but there is limited research evaluating apps for adults, especially involving people with lived experience of autism (Gallardo Montes *et al.*, 2021). Involving lived experience is vital because research indicates that co-production in the development of psychological interventions leads to service provision and research that more adequately address service users' needs (Cox and Miller, 2021; Thornicroft and Tansella, 2005).

The aim of this qualitative study was to use co-production to conduct consultations with expert clinicians about the relationship between autism and social time and the future development of a smartphone app to monitor and support social time in autistic people.

Materials and methods

This study was approved by the South London and Maudsley National Health Service Trust. Participants were practitioner psychologists and psychotherapists from a specialist National Adult Attention Deficit Hyperactivity Disorder and Autism Psychology Service in South London, who took part in a 1-h semi-structured interview. Interviews were facilitated by a researcher with lived experience of autism (M.B.), who received a diagnosis of autism in adulthood, received healthcare for autism and was volunteering for an autism charity and the specialist service.

Interview questions were designed to explore participants' views on autistic individuals' perception of social time, their motivations to socialise, challenges when socialising and potential features, benefits and challenges of a social time app. A topic guide with open-ended questions was developed by authors, who included clinicians, academic researchers and a researcher with lived experience (M.B.). This co-production was an essential part of the methodology so that the interview questions were informed by lived experience and published research. Examples interview questions included "How do your clients understand social time?"; "What do you think are the motivations for people with autism to engage in social situations?"; "What do you think are the challenges?"; "What features would you like an app to have?"; and "What do you think are the challenges of using this app in therapy?". This interview about social time and a potential app was part of a larger interview that also included questions about cognitive behavioural therapy (CBT) for autism. These qualitative findings on CBT for autism has been reported, alongside further information on the specialist service and the lived experience of the researcher, in previous research (Riches *et al.*, 2023).

Interviews were audio-recorded, anonymised and transcribed. Transcripts were cleaned, checked against recordings and analysed using NVivo12 software in accordance with the phases of thematic analysis (Braun and Clarke, 2021; Braun and Clarke, 2006). Two researchers independently conducted the analysis (M.B., C.F.). An open coding style was used. Analysis was regularly discussed between researchers (S.R., M.B., C.F., S.L.N., J.A.) to examine different interpretations of the data and possible ways of grouping codes into

themes. Following the structure of the interview questions, themes were organised by researchers into categories of ‘factors associated with social time’, ‘advantages of social time’, ‘challenges of social time’, ‘features of the social time app’, ‘advantages of the social time app’ and ‘challenges of the social time app’. Themes were reported if they were endorsed by ≥ 3 participants.

Results

Participants ($N = 8$) were mostly female ($N = 5$), in the age range of 25–40 years old. There were six clinical psychologists, one trainee clinical psychologist and one cognitive behavioural therapist.

Table 1 reports full themes, explanations and illustrative quotes. Themes under the category of ‘factors associated with social time’ were *differences with neurotypical populations*, in that three-quarters of participants reported that autistic individuals are more likely to socialise through digital means and about specific topics of interest. Three-quarters of participants highlighted the *need for balance with non-social time*, in such a way that social time is tailored to service users’ needs. Half the participants reported *gender differences* in approaches to socialising, with women appearing more social than men.

Themes under the category of ‘advantages of social time’ were *connecting with people*, in that nearly two-thirds of participants reported that service users recognised the importance of connecting with others and *forming relationships*, with half the participants reporting that a desire to form friendships and romantic relationships was a key motivating factor for engagement with therapy.

Themes under the category of challenges of social time were *limited social skills*, with nearly all participants reporting that autistic service users often struggle to initiate and maintain conversations. Nearly all participants reported that *anxiety* is often experienced by autistic service users when socialising, which can lead to avoidance of social time. Some participants reported that autistic service users often experience *anger and frustration* when engaging in social time due to feelings of rejection, anxiety and judgement.

Themes under the category of ‘features of the social time app’ were that nearly all participants reported it would need to have a *user-friendly design*, including a simple and predictable layout avoiding bright colours, contrasts and patterns to accommodate for sensory sensitivities, a customisable table dividing morning and afternoon activities, the option to add and/or remove columns or change emotion-rating systems and an accessible emotions-rating system and graphs to track progress over time. Half the participants reported the app should incorporate *psychoeducational components*, to help autistic service users recognise and label emotions. Half the participants suggested the app could send *prompts and reminders* to help service users remember to complete app recordings.

Themes under the category of ‘advantages of the social time app’ were that three-quarters of participants reported it could provide *support outside of therapy*, by helping service users monitor themselves and identify patterns in their responses. Nearly two-thirds of participants reported that the app could also provide *support in therapy*, as service users and therapists could look through data from the app together to discuss social time. Half the participants reported that the app could be used by service users for *monitoring emotional responses*, to think about the impact of social time on their emotions.

Themes under the category of ‘challenges of the social time app’ were *task completion*, with half the participants reporting that service users may forget to complete tasks, be reluctant to complete homework between sessions or not know how to complete tasks. Some participants highlighted the importance of *personalising content*, to ensure the app could be customised to account for the heterogeneity of autism.

Theme	Explanation	N (%)	Illustrative quote
<i>Factors associated with social time</i>			
Differences with neurotypical populations	Participants reported that autistic people are more likely to socialise through technological means and around specific topics of interest compared to neurotypical people, who are more used to small talk	6 (75)	<i>“The autistic people that I see maybe do that [socialise] more online or through their phones or things like that rather than face to face and perhaps it’s less spontaneous. So, perhaps, it’s more around like groups or hobbies rather than kind of just general chit chat in the canteen . . . and so probably it’s more around specific focused things than just general day to day small talk.”</i> (#3) <i>“Neurotypical people may seem a lot happier just to meet and have a talk in an unstructured way whereas a lot of people with autism . . . tend to want to meet around a certain topic, which is great. It’s a readjustment for them to be specifically detailed, which is a strength that neurotypical people don’t have. So they would want to meet a group of people that are interested in similar topics as them, for example. (#1)</i>
Need for balance with non-social time	Participants highlighted the importance of a balance between social and non-social time that is tailored to the autistic individual’s needs	6 (75)	<i>“The balance between social and non-social time is likely to be very related to the goals for therapy. It almost always had a sort of social relational dimension to them. So, getting the person to be more aware of social time and to have the appropriate amount of social time for them, I think would be extremely important.”</i> (#5) <i>“I think more balanced but adapted to their personal preferences and needs, and also adapted to what other stresses are going on in their lives and what other commitments there are going on. So I don’t think it’s a static thing.”</i> (#2)
Gender differences	Participants highlighted the idea that autistic women tend to approach socialisation differently compared to autistic men. Women seem to be more social than men and overall more able to communicate with other people	4 (50)	<i>“Some of the women I’ve seen appear more social and overall more sort of able to communicate with other people, so kind of typical of what you’d normally see. And some of the men are a bit more withdrawn, [have] a bit more difficulty actually getting themselves out there and socializing.”</i> (#7) <i>“Often young men want to have sexual over romantic relationships. And often I found women want companionship.”</i> (#3)

(continued)

Table 1.
Thematic analysis of
clinicians’
experiences of social
time for autistic
individuals

Theme	Explanation	N (%)	Illustrative quote
<i>Advantages of social time</i>			
Connecting with people	Participants reported that creating meaningful connections was the main motivator for service users to engage in therapy	5 (63)	<i>“There is an awareness of a genuine need to want to connect with people. And that’s really difficult, but it’s a need that is there.” (#2) “There are goals around socializing, but in a way that is kind of addressing difficulties in socializing, or socializing and building relationships that are meaningful. I think that’s a common goal.” (#2)</i>
Forming relationships	Participants reported that a desire to form romantic relationships and/or friendships was a motivating reason to engage in therapy for autistic individuals	4 (50)	<i>“I think people’s goals for socializing varied, but I mean typical things would be to form friendships, form romantic relationships . . .” (#5) “Sometimes they want to try and meet someone. They might want a romantic partner, which is a common goal.” (#1)</i>
<i>Challenges of social time</i>			
Limited social skills	Participants reported that limited social skills is a particular issue for autistic individuals, as they struggle to initiate and maintain conversations	7 (88)	<i>“For some people it’s an awareness of a skills deficit. Just not knowing how to start a conversation or how to keep a conversation going unless it’s about a particular topic or interest; or maybe just not liking small talk and feeling like you need to make small talk.” (#2) “They also might find it hard to know exactly what to say or . . . are worried that maybe they are not saying the right thing, or that they don’t know how to initiate a conversation, or feel like they are not interested in the topic they are talking about or even just lack the social skills.” (#3)</i>
Anxiety	Participants reported that anxiety is one of the main emotions experienced by autistic individuals when approaching social situations, which can lead to avoidance of social time	7 (88)	<i>“I think anxiety is one of the main ones. And a lot of worries about not knowing what to say or not knowing how to behave. Worries about how they might be perceived by others. Worries about feeling anxious and how that will come across and how that will impact the way that they interact or approach a situation. Worries that people will respond negatively in some way.” (#4) “Dread, fear, apprehension, anxiety, panic . . . scared or just a strong wish to avoid.” (#2)</i>

(continued)

Table 1.

Theme	Explanation	N (%)	Illustrative quote
Anger and frustration	Participants reported that anger and frustration are commonly experienced by service users when engaging in social situations. This could be due to feelings of rejection, anxiety or judgement	3 (38)	<i>"I suppose feeling frustrated and feeling embarrassed. And then feeling angry or rejected. I think that [they think that] they're being negatively judged or that they don't know what to say." (#3)</i> <i>"Anxiety and then associated . . . consequences of those difficulties . . . like frustration and anger." (#5)</i>
<i>Features of a social time app</i>			
User-friendly design	Participants highlighted the necessity of the app being user-friendly, with a simple and predictable layout. Participants suggested the layout could consist of a simple customisable table featuring a division between morning and afternoon activities and the possibility to add and/or remove columns or change emotion-rating systems. Participants also emphasised the need for the app to accommodate sensory sensitivity of service users by avoiding bright colours, contrasts and patterns. Participants suggested the addition of an emotions-rating system and graphs to track progress over time in an accessible way	7 (88)	<i>"I think it needs to be very user-friendly. So it needs to be easy to use. It needs to be easy to input information in. So on that I think it needs to be relatively predictable, in terms of words and categories." (#5)</i> <i>"I think it would look something like, days of the week, am/pm, social tasks, non-social tasks, and . . . maybe two columns: one on how much energy they felt they spent on it, as in how tired or energized they are; and another one on general mood, or something like that. So, say if they have no idea how to score their mood, it could then maybe be changed into a simpler rating system." (#1)</i> <i>"Something that is not too busy, something that's not too kind of overstimulating. I think [that] is something that's really important. So . . . avoiding lots of loud colours or noises or buttons. Thinking about it from a sensory perspective." (#4)</i> <i>"I think often . . . some of the people with ASD . . . quite like to think about things in an analytical way, so something that could give you a graph or some kind of correlation or kind of score things in some way so we can have some data to work on." (#2)</i>
Psychoeducational components	Participants reported it would be beneficial for the app to have a psychoeducational component explaining how to recognise and label emotions and how to record them in the app	4 (50)	<i>"I think that maybe there needs to be sort of an extra piece. Extra thoughts about how emotions are labelled so maybe, have a psychoeducation section about emotions, activities . . . more explanations so people can go and apply that. Because people might not know how to label those things." (#7)</i> <i>"I suppose, to be accessible and</i>

(continued)

Table 1.

Theme	Explanation	N (%)	Illustrative quote
Prompts and reminders	Participants suggested the app could send gentle reminders to service users to remind them to complete the app recordings and the activities they scheduled in the app	4 (50)	<i>customizable. So you could have options of like selecting different activities to make it easier. But then it would also be useful to have an example of one that was already completed. And . . . yeah and then you could rate the impact that social and non-social time had on your feelings as well.” (#3)</i> <i>“I guess thinking about . . . any kind of app usage . . . having gentle reminders helps with . . . keeping up with any kind of habit or task. Any kind of gentle reminders could be quite good.” (#4)</i> <i>“Even having reminders on your phone to remind you to do what you’ve said that you’re going to do in your diary.” (#7)</i>
<i>Advantages of the social time app</i> Support outside of therapy	Participants reported the app could be a useful tool for service users to use outside of therapy to monitor themselves and the impact that their division of social and non-social time has on their quality of life	6 (75)	<i>“I think that anything that can help outside therapy is wonderful because therapy is usually an hour a week and actually you need something to maintain people outside of that. And even when they don’t have access to therapy, that could be something that they can start doing before they have access. So, I think that those kind of things are really important to have.” (#7)</i> <i>“Would it be useful without a therapist? Yes, absolutely. I think it could be very useful without therapists.” (#5)</i> <i>“As a learning design, it is quite possible to kind of help someone identify their own patterns. It could be thinking about kind of change beyond that, that’s where a therapist might come in to kind of help with . . . what happens next. But I guess as a monitoring type of exercise it could be done independently.” (#4)</i>
Support in therapy	Participants reported that the app could be used in therapy sessions, enabling therapists and service users to discuss progress and reflect on the impact of activities completed during the week	5 (63)	<i>“I think it would be tremendously useful in sessions . . . you could envisage a situation where a client and a clinician are looking at the app together on their own personal devices. So perhaps . . . a client could come to the session and have a portion of the session devoted to thinking about the app and what he had done that week, the social time, with the data presented nicely on the app. And</i>

(continued)

Table 1.

Theme	Explanation	N (%)	Illustrative quote
			<i>that actually could become an integral part of what you do in the sessions.” (#5) “We are sort of trying to move towards tech type of stuff in sessions and if it was ... on an iPad or on something like that, you could look at the diary entries over the week and sort of think about it. Reviewing progress could be something that would be quite good in terms of planning.” (#4)</i>
Monitoring emotional responses	Participants reported that the app could be used to help service users monitor their emotional responses. For example, it could help them to identify the emotional impact of social and non-social time	4 (50)	<i>“I think as a kind of a monitoring exercise. We would use those kinds of things to get ... a picture of how they’re spending their time and ... of how they’re feeling about their energies kind of being divided up across the day.” (#4) “I think part of emotional regulation skills that could be helpful to build is the idea of learning more about social time and non-social time and the impact that it has. Because maybe they have the idea that they should be socializing more but then that might not be something that actually works for them ... So maybe it would be useful in kind of challenging that belief.” (#3)</i>
<i>Challenges of a social time app</i>			
Task completion	Participants reported that completing the tasks on the app could be challenging due to service users forgetting to do it, not wanting to do homework between sessions or not knowing how to do it	4 (50)	<i>“As with anything, it’s about whether they remember or whether they can be bothered or whether there’s time, whether they feel too overwhelmed by another thing ... I think it’ll depend on lots of individual factors.” (#2) “I guess kind of completing any kind of homework task or in-between sessions time is often not appealing to some people.” (#4) “So there might be some problems in when to record, how to record.” (#1)</i>
Personalising content	Participants reported that the app and its content would need to be customisable to account for heterogeneity in autism	3 (38)	<i>“I think other challenges might be design, making something that is as user friendly, as interactive and as attractive as you would want. I think that can be very challenging ... I think with apps and mobile technology, so many apps are being designed that no one is using. So I think perhaps it would have to be thought through exactly how to use it.</i>

(continued)

Theme	Explanation	N (%)	Illustrative quote
			<i>I think some thought would need to go into the design and functionality of the app to make it something that people would use and come back to.” (#5) “I guess . . . if things are not clear for people . . . If they’re not able to adapt it to what their needs are. I guess just thinking about visually, can people expand the text? I think it has to be quite a sophisticated piece of software that can incorporate a range of things. Because people with autism are on the spectrum and they say “when you meet someone with autism you’ve only met one person with autism”. So you need to . . . think about all the different range of people that might be using the app and that can make it more complex and challenging, but it . . . is important to think about those things. I think that might be one of the challenges: actually making it useful for everybody with autism.” (#7)</i>

Source: Created by the authors

Table 1.

Discussion

This study explored the relationship that autistic individuals have with their social time and the potential impact a social time app could have on their lives and psychological therapy. Clinicians highlighted that autistic individuals recognise the importance of social time but experience difficulties when engaging with others; and they identified potential benefits of a social time app, including applications for therapy. Findings indicate that a social time app that incorporates a user-friendly design, psychoeducation, prompts and reminders and anticipates difficulties completing app tasks could benefit autistic individuals, their family and friends, their clinicians and other clinicians working with this population.

Issues with social time for autistic individuals reported by clinicians were consistent with those identified in previous research, including perpetuating associations between communication and social anxiety (Spain *et al.*, 2018), and findings on gender differences, which suggest women are usually more capable of camouflaging their autism, maintaining eye contact and recognising subtle emotional changes (Tubío-Funqueirino *et al.*, 2021). Although research indicates that increasing social time for autistic individuals improves mental health (Tobin *et al.*, 2014), the findings of this study highlight the importance of individuals finding an optimal balance between social and non-social time for their mood and well-being, rather than simply seeking to just increase their social time. This study also supports the view that this balance could be successfully monitored and supported using a social time app, which, according to the participants in this study, clinicians would be open to incorporating within psychological therapies to support emotional regulation. This finding is consistent with the growing interest in technology-based treatments for autistic individuals (Liu *et al.*, 2017). Research indicates that

apps can help autistic children with communication, social skills and emotions (Gallardo Montes *et al.*, 2021); and a social time app for autistic individuals could follow the model of apps for other mental health conditions, which provide the facility to monitor cognitive and emotional experiences (Garety *et al.*, 2021) and improve general functioning (Marshall *et al.*, 2021).

Strengths of this study include the involvement of a researcher with lived experience of autism; a qualitative methodology that provided direct access to the subjective experience of expert, specialist clinicians; and a focus on the neglected area of digital interventions for autistic adults. Limitations of the study include the small sample size, the limited scope of the interview and the fact that participants were recruited from just one service and from within only the psychology and psychotherapy professions, which may limit generalisability.

Future research should collect data from people with lived experience of autism to inform the development of a social time app. This data would complement the findings from clinicians that are reported in this study. Future development of the app should incorporate the recommendations outlined in this study, including a simple and predictable layout without bright colours, contrasts or patterns, a customisable table dividing morning and afternoon activities, accessible emotions-rating systems and graphs to track progress and the ability to adapt columns and emotion-rating systems. A prototype of the app could be developed and tested using experience sampling with autistic people, including those currently engaging in psychological therapy, so that its potential applications inside and outside of therapy are investigated. The clinicians involved in the care of these service users could also be consulted to investigate potential implications for therapeutic interventions from clinician perspectives. Such research could combine use of the app with use of wearable devices to collect physiological data on stress responses during social time (Masino *et al.*, 2019).

In conclusion, clinicians appear to recognise the potential benefits of an app to monitor social time and its impact on mood and well-being for autistic individuals. Recommendations for the development of this app outlined in this paper, alongside future input from autistic service users, could be used to inform the creation of a prototype social time app to improve well-being and quality of life for autistic individuals.

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