

Love on the Spectrum: Toward Inclusive Online Dating Experience of Autistic Individuals

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ABSTRACT

Online dating is a space where autistic individuals can find romantic partners with reduced social demands. Autistic individuals are often expected to adapt their behaviors to the social norms underlying the online dating platform to appear as desirable romantic partners. However, given that their autistic traits can lead them to different expectations of dating, it is uncertain whether conforming their behaviors to the norm will guide them to the person they truly want. In this paper, we explored the perceptions and expectations of autistic adults in online dating through interviews and workshops. We found that autistic people desired to know whether they behaved according to the platform's norms. Still, they expected to keep their unique characteristics rather than unconditionally conform to the norm. We conclude by providing suggestions for designing inclusive online dating experiences that could foster self-guided decisions of autistic users and embrace their unique characteristics.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in accessibility**; • **Social and professional topics** → **People with disabilities**.

KEYWORDS

online dating, autism, inclusive design, participatory design workshop

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1 INTRODUCTION

With just swipes of a finger, we can easily initiate romantic relationships on dating platforms. Especially for autistic individuals¹, who feel social-emotional pressure (e.g., eye-contact) in face-to-face communication [69], online dating provides opportunities to engage in romantic relationships with reduced anxiety [54]. In online dating, autistic individuals can have more control over presenting themselves (e.g., constructing dating profiles or communicating via text); there are fewer nonverbal cues (e.g., body language), which are challenging to translate; and sufficient time is given for users to understand and find ways to deal with vast amounts of information [66]. Due to these affect-limited and time-delayed characteristics of online dating [12], autistic people are flowing into online dating services to an even greater degree than members of the neurotypical population [29, 66].

While online dating has made romantic relationships more accessible to autistic individuals, it brings a new set of challenges because it is full of unwritten social norms and subtle customs, which may not be easy for them to comprehend [15]. For example, constructing a dating profile requires selective self-presentation, which involves competencies such as highlighting attractive traits while excluding undesirable information [30]. When it comes to browsing prospective partners, users need to glean accurate impressions from others' profiles within a moment; at the same time, they have to distinguish those who are being deceptive. There also exist risks of victimization for autistic individuals [23, 70] as discerning abnormal requests from strangers or financial scam is a complex task for them [30]. To address these issues, several studies have investigated how autistic adults experience online dating services regarding successful matching and safety [28, 29, 65, 66]. In particular, many of these works have concentrated on identifying self-presentation characteristics of autistic people in dating profiles [28, 29, 66] and have proposed guidance to be more attractive on platforms [29].

¹In this paper, we opt to use identity-first language by reflecting the preferences of autistic people [42] and recent trends in academia [10].

However, the ultimate goal of online dating is to find love, rather than to be desirable to everyone. Adjusting their behavior using strategies defined by neurotypical society may yield more matching opportunities, but it is uncertain whether this will lead to relationships with truly-desirable partners. Despite increasing works analyzing and evaluating the characteristics of autistic online dating users, however, few studies have attempted to explore their voices in-depth: how they want to present themselves to potential partners, what types of people they would like to date, and what challenges they face in online dating. Given that autistic people may have particular expectations of their romantic partners (e.g., understanding of autism) [18], online dating services need to resonate with the unique needs of autistic users to enhance their dating experience.

With this background, we seek to explore the perceptions and expectations of autistic people in the online dating experience and how those opinions are presented in their behavior. With 12 autistic individuals, we conducted workshops using three mimicking activities that users can encounter in online dating services such as (1) creating a dating profile, (2) browsing others' profiles, and (3) messaging with matched partners. Our findings reveal that autistic individuals desire to find the characteristics of romantic relationships different from the general context and want to be informed whether they behave in accordance with social rules. At the same time, autistic individuals wanted to maintain their unique characteristics rather than unconditionally conforming to norms, even if they were perceived to be less attractive. Building on these findings, we suggest design implications to cultivate an inclusive online dating environment that embraces the unique characteristics of autistic individuals and fosters their self-guided decisions.

The contribution of our paper is two-fold: 1) We identified unobserved expectations, strategies, and challenges of autistic individuals in their online dating experiences; and 2) We proposed implications for designing inclusive online dating environments for autistic users that can respect their opinion and facilitate their self-directed behavior.

2 RELATED WORK

2.1 Romantic relationships and online dating experiences of autistic individuals

Just as finding a romantic partner is one of the most important parts of people's lives, most autistic individuals also desire romantic partners and to be in relationships [7, 33, 40]. They have a specific conception of romantic relationships, similar to that of the neurotypical population [67]: a relationship in which they spend time with a partner, share experiences and interests, and are honest but respect each other's boundaries. At the same time, several researchers have found that autistic persons have distinct expectations for their ideal partners [18, 67]. For example, they put as a significant criterion for the partner to have an understanding of autism [18], and many prefer that the partner also be autistic or neurodivergent [67]. Autistic people also have concerns about romantic relationships. For example, they have been found to be afraid of not meeting expectations of their partners [75], of outcomes of future relationships such as rejection [33], and of their safety against victimization [67]. In particular, previous study [33] has pointed out that autistic individuals interested in dating had significantly fewer

chances to meet potential partners because they had, compared to the neurotypical population, fewer social experiences of meeting diverse people in educational or workplace settings. Furthermore, even if they find someone they are interested in, initiating a romantic relationship brings a much higher level of anxiety for autistic people [69], who typically have social-emotional pressure (e.g., eye contact) in face-to-face communication [33].

A growing body of study [26, 54, 62, 66] has found that online dating can offer a promising environment for autistic individuals who have struggled with initiating romantic relationships offline. Roth and Gillis [66], who conducted a survey investigating the online dating experiences of autistic individuals, found that autistic respondents enjoy having a large pool of people to contact, people who were previously inaccessible, and they feel more comfortable presenting themselves in written form, which offers reduced social demand and sensory sensitivity. In addition, several studies [62, 66] revealed that the ability to control the pace of communication and to revise written messages are reasons that autistic persons prefer online dating. On the other hand, online dating has downsides for autistic users. Although online communication is less burdensome, users must interpret new types of unwritten social norms and the subtle customs of online dating [15, 66]. Previous research [23, 70] revealed that developing the digital communication competencies necessary for online dating, such as disclosing information by balancing one's safety and self-presentation or reading accurate impressions from others' profiles may not be easy for autistic people. Furthermore, Gibbs et al. [30] argued that autistic users are likely to be victims of romantic scams or may unquestionably accept requests from strangers who could be online predators, because these users can find it difficult to determine whom to trust online [15].

Recognizing the challenges and potential risks of autistic users' online dating experience, several researchers made attempts to examine how autistic people use online dating services [13, 28, 29, 65]. Roth's work, which compared the online dating experiences of 30 autistic individuals and 56 neurotypical individuals [65], discovered through a survey that autistic online dating users experienced more harassment and exclusion than did neurotypical users. He also reported that autistic users sometimes engaged in potentially dangerous behaviors such as actively pursuing offline meetings even at stages at which there is little information about the online partner. Interestingly, most studies associated with the online dating use of autistic people [13, 28, 29] have focused on how such people present themselves in dating profiles. Gavin et al. [28] analyzed the dating profiles of 52 autistic males and found that, although they expressed many of the personality attributes considered attractive, they displayed high frequencies of traits typically regarded as unflattering, such as being shy, geeks, and gamers. Also, in their profiles, words considered positive, such as honesty, were often presented as flaws with negative comments. Inspired by the findings of this research, Gavin et al. [29] conducted a study to evaluate how attractive, trustworthy, and desirable to date an autistic male's online dating profile was for a neurotypical female.

Although efforts have been made to enhance the online dating experience of autistic people, many works have concentrated on exploring how autistic users can be viewed as more desirable and attractive from the perspective of a neurotypical society. Existing

guidelines for successful online dating experiences have the potential to enforce socio-normative behavior on autistic users, rather than respecting their unique values and aspirations for romantic relationships. Therefore, it seems that more study is needed to explore the needs and expectations of dating services from the viewpoint of autistic users.

2.2 Inclusive online dating for autistic population

For populations with unique identities, such as people with disabilities or LGBTQ+ adults, online dating is an important way to meet potential romantic partners [64, 68]. As popular dating apps like Tinder [76] or OkCupid [56] typically perpetuate prescriptive views of ableism and sexuality [17, 22, 36], minority group users may face various inclusivity issues that the majority of users do not consider. Disclosure of sensitive information related to one's identity, such as disability or sexual orientation, is the most important [32] but challenging aspect of the online dating experience because such information often brings risky consequences like harassment [31, 34, 61]. In an environment with a risk of victimization, people with transgender identities have devised strategies to proactively mention their trans status for safer and more reliable dating [25]. In addition, Porter et al. [61] reported in their study that online dating users with disabilities may disclose their disability as a tactic to filter out potentially ableist dating partners.

Another noteworthy inclusivity issue associated with most online dating platforms is matchmaking systems that filter and sort user profiles to make recommendations [71]. Many existing online dating services seem to provide users control over their partner selections via filtering functions; however, profiles that users can browse are preselected by system algorithms [79]. These algorithmic systems generally provide the best romantic match based on similarity or complementarity between users [79] (e.g., calculating compatibility scores for users [24, 55] or using collaborative filtering [46, 48]). However, recent affinity-based matchmaking algorithmic approaches have been criticized for exhibiting a “relational filter bubble” effect [58] that strengthens people's homophily while limiting the heterogeneity of their intimate interactions, thus further deepening the existing prejudices of online dating users [52] and bringing a risk of excluding minority groups from recommendations [39, 86]. In light of this, there is a possibility that matchmaking systems will be less likely to recommend a wider variety of partners to relatively small groups of users in online dating when their identities are explicitly revealed, either through their profiles or, implicitly, through their behavior.

While studies have been conducted on the inclusivity challenges that people with disabilities and LGBTQ+ people can face in online dating, there have been few studies on whether the online dating experience is inclusive for autistic users. Online dating platforms targeting autistic people, including Hiki [37] and Aspie Singles [2], are currently serving in the market to provide such users with safe and inclusive dating environments. However, compared to dating services that target everyone, these exclusive platforms have small user pools, so it is not easy to seek a variety of people. In this regard, our research explores how to provide an inclusive dating experience

to autistic people in an online dating environment where everyone can gather.

3 STUDY DESIGN

The purpose of our study was to understand what perceptions and expectations autistic adults have of online dating platforms and how those perceptions and expectations are reflected in their behaviors. To this end, we conducted group workshops in which participants were able to experience various situations related to romantic relationships on online dating platforms.

3.1 Participants

Because the study requires understandings of the characteristics of finding potential dates online, we set out four criteria to recruit suitable participants for our study: 1) adults who have been diagnosed with Autism Spectrum Disorder (ASD) or who identify themselves as ASD; 2) individuals who are able to communicate with others, understand the interview questions and fill out the worksheets presented in the workshop; 3) those who are interested in and want to be in a romantic relationship, and 4) individuals who have experience seeking romantic partners on online platforms such as dating apps or SNS (Facebook, Instagram, Twitter, online communities, etc.) Participants were recruited in a variety of ways. We advertised our study in online communities where Korean autistic adults and their parents communicate actively. We also put up flyers at local welfare centers and university campuses in City Daejeon and Seoul, South Korea. In turn, a total of 12 autistic adults responded that they would participate in the study.

The average age of the participants was 24.3 years (range: 20-36, SD = 5.1); ten participants identified as males and two as females (Table 1). The gender balance of the participants reflects the diagnosis distribution discovered in previous studies, which is 4 - 7.38 : 1 (male : female) [6, 81]. Of the 12 participants, 11 were diagnosed with ASD; P5 was self-diagnosed through an online ASD test. We asked participants if they could reveal their sexual orientation, and they all indicated they were heterosexual. All participants, except for P7, had never been in a romantic relationship but had a desire for one. P7 had been dating an autistic boy whom she met via Twitter for several years. In addition, all participants had experience finding romantic partners through online platforms, and two participants (P1, P7) had used more than five online dating services accessible in Korea, including Tinder. All participants were Korean and were compensated about \$50 USD (approximate value) for participating in both interview and workshop sessions.

3.2 Pre-Interview

Before conducting workshops, we performed semi-structured interviews with the participants. This interview aimed to explore their existing perceptions of romantic relationships and online dating platforms. The questionnaire covered participants' overall thoughts about romantic experiences, prior experiences of finding dating partners and interacting with them online through dating apps or SNSs. Furthermore, topics that participants were particularly excited about or worried about in online dating throughout the interviews were incorporated into the workshop materials. The interviews lasted about 40 minutes and were conducted on Zoom.

Participant ID	Age	Gender	Diagnosis
P1	27	F	ASD
P2	32	M	ASD
P3	20	M	ASD
P4	20	M	ASD
P5	36	M	Self-diagnosed
P6	21	M	ASD
P7	21	F	ASD
P8	23	M	ASD
P9	24	M	ASD
P10	21	M	ASD
P11	21	M	ASD
P12	25	M	ASD

Table 1: Demographics of study participants.

The whole process was audio and video recorded with participant permission.

3.3 Group Workshop

We constructed workshops in which participants were able to experience the main processes of an online dating service in a round-about way. This workshop aimed to capture participant behavioral traits during online dating and to discover their in-depth opinions regarding needs and challenges. Moreover, the indirect experience of the workshop made it possible to rule out potential risks or traumatic wording that participants might unexpectedly encounter while using the actual platform. In designing the workshop, we took into account a participatory design (PD) approach, which is effective at eliciting the voices of individuals with special needs by involving them as design partners [8, 47].

The workshop consisted of three main sessions, focusing on activities that can happen within an online dating service [71]: **(1) creating a dating profile, (2) browsing others' profiles, and (3) messaging with matched partners.** We established a group setting in which two autistic individuals worked together with researchers to foster their autonomy [72] and the expansion of their ideas [8]. P2 and P14 participated independently in the workshop because they requested not to interact with other participants. In addition, since it is critical to offer appropriate support to allow autistic participants to focus on individual tasks and take part in group discussions [27], we provided one-on-one support for each participant.

In each session, participants first listened to the researcher's explanation of the activities and then proceeded with tasks individually with the researcher. Researchers observed these activities and intermittently asked reasons for certain behaviors or content written by participants. Researchers consistently strove to guide participants to think for themselves by asking questions in ways that did not affect their original thoughts (e.g., "What would potential romantic partners think of you if they saw this?"). After the individual activity, participants shared their work and exchanged feedback. The session ended with collaborative ideation for social

or technological support that could help them better perform each online dating task. Below, we outline how the worksheet was designed to engage our autistic participants and extract their needs, and how the participants produced data during the workshop.

3.3.1 Creating a dating profile. In the first session, we requested that participants encode a dating profile through which they could present themselves as potential romantic partners. The profile creation worksheet (Figure 2-A) contained items commonly provided in the dating profiles of various existing dating apps such as Tinder [76], OkCupid [56], and Bumble [14]. Participants were able to choose profile photos from their mobile phones and attach printed photos on their profiles. The profile worksheet included short-answer items such as "name," "occupation," and "interests"; large box-type spaces were offered for items like "self-introduction," "a person I am looking for," and "additional information about me", allowing participants to express themselves freely. By providing both short-answered structured spaces and box-type flexible spaces, we tried to keep a balance between scaffolded and flexible approaches, which is significant in workshops for autistic people [84]. We also informed participants they could erase items with correction tape if they did not wish to disclose that information.

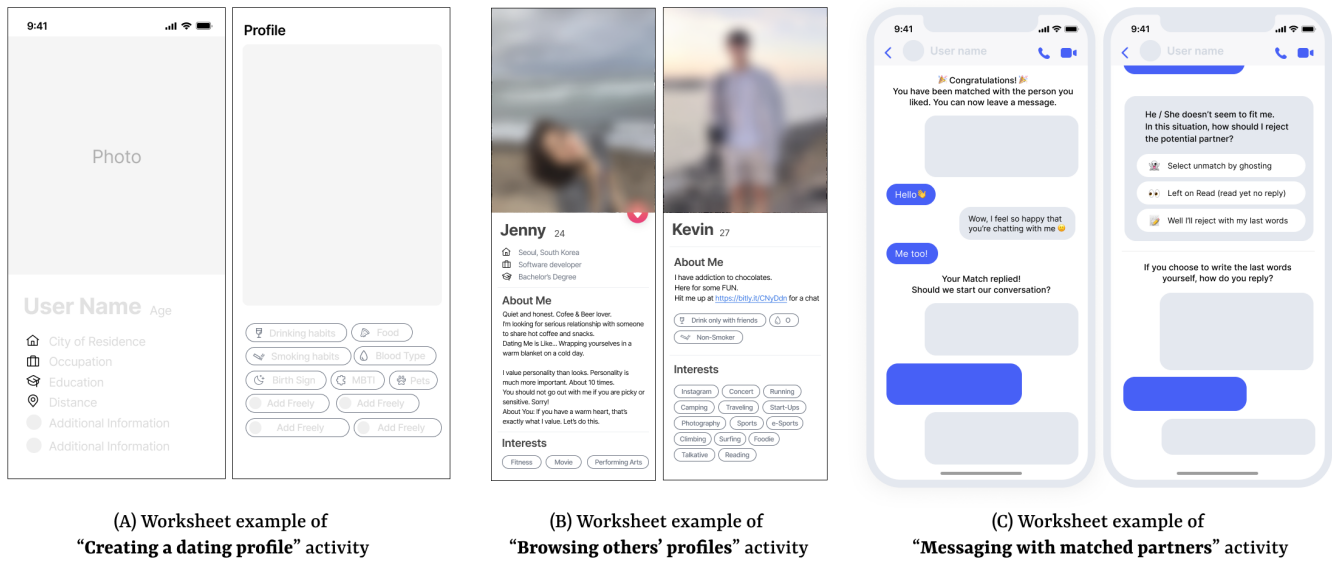
After constructing their dating profiles, the participants were asked to introduce each other to their profiles. They then shared their impressions, specific points they liked about others' profiles, challenges of constructing dating profiles, and tips to make better profiles.

3.3.2 Browsing others' profiles. The second session was designed to identify how the participants sought romantic partners in online dating. To provide an environment in which participants were able to explore as many different types of partners as possible, we generated a set of 14 virtual dating profiles for each man and woman (Figure 2-B), using various criteria: 1) We determined ten different features of profiles by combining the ten personality types in online dating profiles (e.g., extraversion, emotional stability, etc.) [78] and the amount of information (e.g., profile photos, self-introductions, keywords of interest, etc.) 2) Considering that the participants were highly concerned about scam profiles, we included two scam profiles; this was achieved by mimicking scam profiles using certain heuristics [19] (e.g., a photo of model-like appearance, a small amount of information, outside links, etc.) 3) We decided to include two profiles of autistic people and individuals with physical disabilities, since most participants noted that they were open to partners' with disabilities and autism. After specifying the traits of the 14 profiles, we explored actual dating profiles in the Tinder app that most closely resembled those traits, and created virtual profiles by referencing them.

Participants browsed these 14 dating profiles and selected potential partners they wanted to contact. To better understand the participants' criteria for evaluating potential dates, we requested that they highlight each profile with a red pen for things they liked and with a blue pen for things they did not like. We also asked participants to put a heart-shaped sticker on profiles they liked and an angry-face sticker on profiles they did not like (Figure 4), fostering the engagement of our autistic participants who are more sensitive to visual stimuli [35, 73, 85]. After completing the individual tasks, the participants shared their favorite profiles and their



Figure 1: Capturing the moments during workshops.



(A) Worksheet example of “Creating a dating profile” activity

(B) Worksheet example of “Browsing others’ profiles” activity

(C) Worksheet example of “Messaging with matched partners” activity

Figure 2: The worksheets used in workshop sessions.

own standard for evaluating romantic partners; they also indicated further information or support they needed.

3.3.3 *Messaging with matched partners.* In the last session, participants generated messaging scenarios in which they talked about several topics with prospective partners they had chosen from the previous session. Based on previous studies and the results of our interviews, we selected six main conversation topics. First, we chose three topics that have been mainly addressed in previous studies and articles related to online dating (*Sending first messages* [9], *Rejecting partners* [45, 80], and *Dealing with romantic scammers* [1, 83]). The remaining three consisted of topics our participants mentioned they either preferred or worried about in the interview (*Talking about their interests*, *Talking about partner’s interests (far from theirs)*, and *Disclosing their autistic features*). Moreover, we utilized various design elements to allow participants to be more absorbed in virtual conversations (Figure 2-C): 1) The worksheet was designed in the form of a mobile chatting room; 2) We arranged the order of the six messaging topics according to the process of initiating relationship, building intimacy, and ending relationship; 3) Dialogue-type

descriptions were provided between the conversations to help participants recognize situations.

During the session, participants either sent first messages to partners or responded to partners’ messages provided on worksheets. To capture their expectations for romantic conversations, we then asked participants to freely envision the following conversation. As a final step, participants shared their most intriguing and challenging conversations and worked together to make strategies to cope with those challenging topics.

After all sessions, we asked participants about their overall workshop experience. The questions covered what they had learned or realized about romantic relationships through the workshop and whether their thoughts on online dating platforms had changed after the activities. The entire workshop session lasted about two hours; the whole process was recorded on audio and video.

3.4 Ethical considerations

Our study was approved by the Institutional Review Board. Our study materials and protocols were scrutinized by a psychiatrist, one of our authors, with over ten years of experience with young

autistic adults. Participants read the consent form before participating in the study, and they all understood and agreed to the content. We informed participants that there would be no disadvantages even if they quit in the middle of the study. Since our study addressed romantic experience, a personal and sensitive issue, we handed out interview and workshop questionnaires to participants in advance and asked if they thought there was any inappropriate content. None of the participants requested corrections to the questionnaire or expressed unwillingness to answer. To ensure that participants did not become too nervous or disappointed with the workshop, we clearly articulated that the workshop is not an activity like an actual blind date; rather, we asked them to see it as an opportunity to practice online dating with the researcher. Furthermore, we attentively monitored the condition of the participants and provided break times about once every hour, considering that autistic individuals often have low levels of concentration.

3.5 Data Analysis

All audio recorded from interviews and workshops was transcribed. We created observational notes by capturing the reactions of participants (e.g., facial expressions when they were happy, behaviors when they seriously contemplate, etc.) in each workshop. The data analysis content included the transcription, observational notes, and participant worksheets. We analyzed these data by conducting open coding with thematic analysis [11]. Throughout this process, we focused on examining how autistic participants perceive online dating, how they present themselves, perceive others, and maintain romantic relationships, what they expect from online dating, what challenges they face while pursuing their expectations, and how they respond to these challenges. At first, one author generated initial code themes using ATLAS.ti [3]. Other researchers read those initial themes and corresponding quotations and responded with feedback. Then, the whole research team discussed disagreements and iteratively revised themes.

4 FINDINGS

In this section, we report major findings about the challenges, strategies, and needs of autistic participants in seeking romantic partners through simulated dating activities. In particular, we describe how participants initiate online dating activities and how they respond to romance scams. We also sought to understand their expectations about learning romantic norms on the platforms and presenting their true selves. The results of the online dating workshop are summarized in Appendix A.

4.1 Initiating romantic interaction based on personal interests

While the participants were highly interested in romantic relationships, initiating interaction with a potential romantic partner was challenging for them. Just as many autistic individuals have little experience finding and appealing to potential romantic partners [33], all the participants except P7 had no previous experience of being in a romantic situation. It led the participants to be baffled by the tasks required to start and maintain romantic relationships on dating apps.

What to write and what to do doesn't suddenly come to my mind because I've never done it, even though I'm interested in (a romantic relationship). There is no dating methodology or dating dictionary. I don't know how to make myself stand out or express my feelings. (P2)

In an unfamiliar romantic context, the participants gradually started dating activities centered on their specific interests. For example, participants who had difficulty introducing themselves in their dating profile first wrote about their interest in the keyword section. As having specific interests is a common trait of autistic individuals, the participants included an average of 10.08 and a maximum of 19 interest keywords and wrote them with enjoyment and without difficulty. In addition, they felt burdened by and hesitated for a while during the task of sending first messages to their matched partner; then, they began the conversation by asking their partner about common interests (Figure 4 - (A)). The interests they included became a starting point for them to think about how to present themselves in online dating. Based on their interests, they identified their personalities, lifestyles, or strengths and reflected on whether these aspects could serve as advantages in the dating context.

When I worked as an intern, many teachers there told me that I was really good at this (exercise which he wrote as his interests). I showed them how to play soccer during break time. I think I could emphasize this as my charm. (P11)

Personal interests also became important criteria for the participants when browsing their potential partners. Participants commonly sought a “romantic partner who could respect them.” However, assessing whether the partner would respect them based on dating profiles consisting of fragmentary information (e.g., age, occupation, and favorite songs) and nuanced self-introduction was not easy for the participants. Therefore, they devised a strategy to focus on identifying whether profiles contained interests similar to theirs as they assumed that people with the same interests would be more likely to appreciate them.

I really liked this person because she has the same hobby (dinosaurs) as me. So, I think we would hit it off well, and she would be able to respect me. (P9)

Personal interests triggered the participants to engage in unexplored online dating platforms and, therefore, allowed them to think about themselves and others in a dating context.

4.2 The trade-offs of anxiety towards scammers

Ensuring safety of the dating apps, which build intimate relationships only through photos and text, was a significant concern for the participants. The autistic participants found it challenging to interpret the implicit signals underlying the profiles and messages. This was the primary reason that many participants (P2, P3, P4, P6, P7, P9, and P10) could not try dating apps even if they wanted to.

It is difficult for us to ascertain whether this person is good or bad. I couldn't use dating apps because it was so difficult to predict whether there would be a person

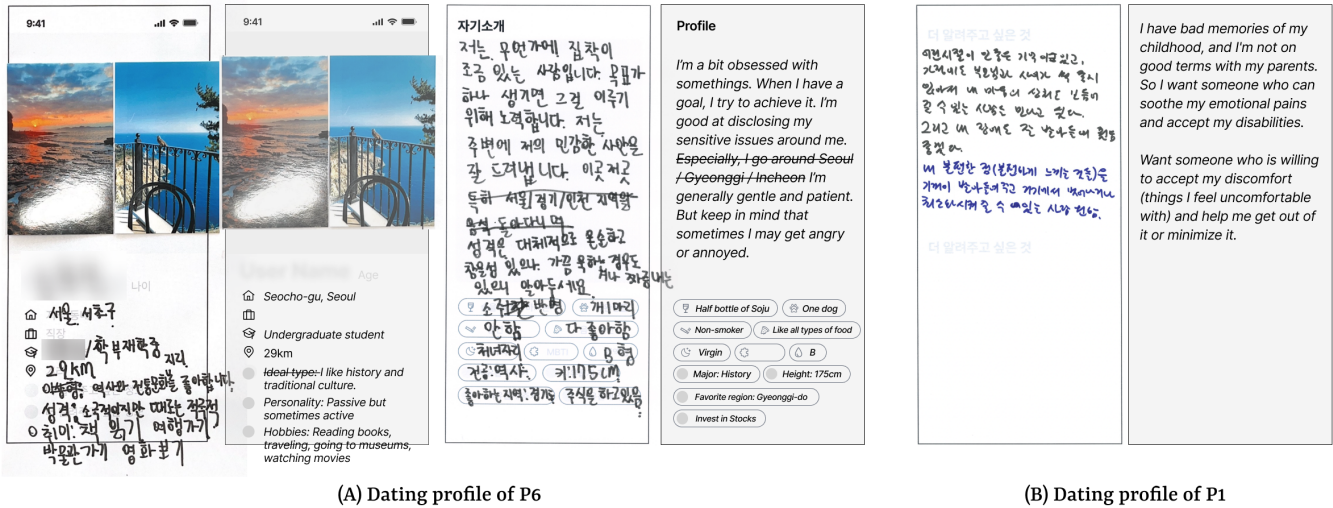


Figure 3: Dating profiles created by the participants. (A) P6 tried to share as much information about himself as possible. He also presents that he is a bit obsessed with something and sometimes gets angry or annoyed. (B) P1 talked about her childhood and how that influenced her ideal partner in the space for additional information.

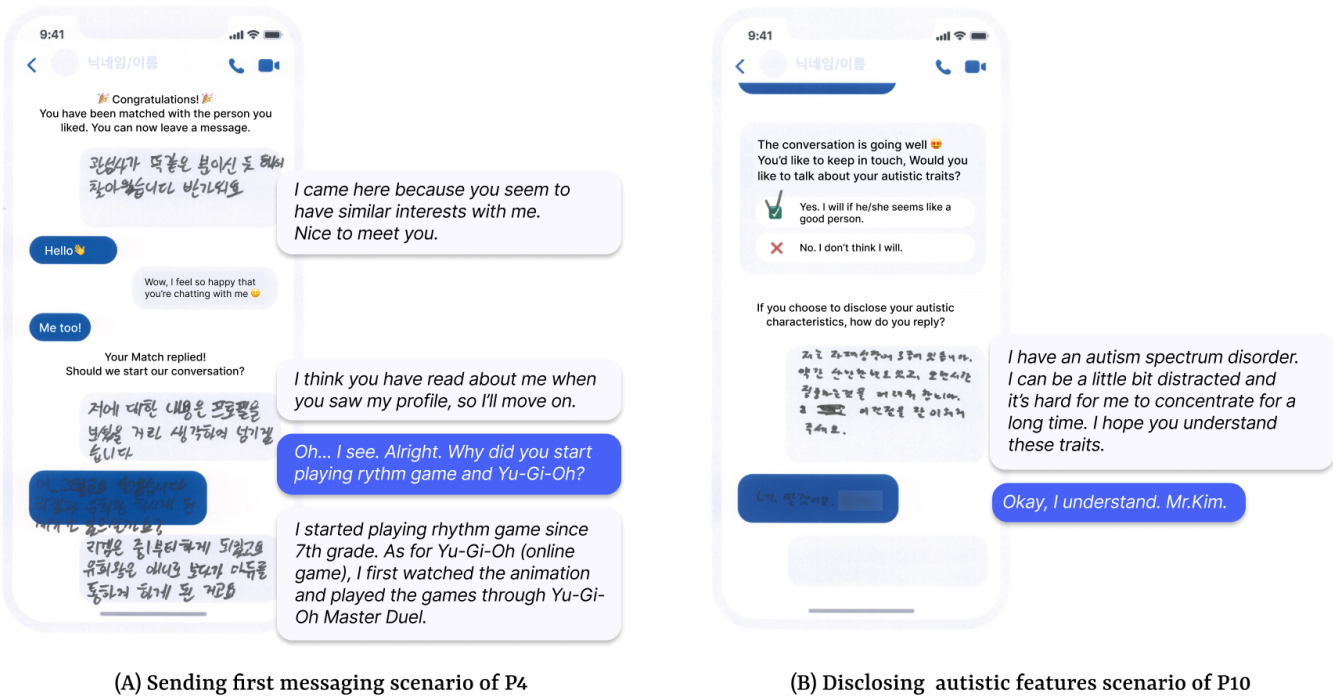


Figure 4: Conversation scenarios generated by the participants. (A) P4 initiated the conversation by talking about his interests. (B) P10 explained his autistic characteristics in detail and asked for an understanding of potential partners.

or a demon there. If I met a wrong person, I could blow my money. (P3)

One participant (P1) confessed that she had experienced becoming a target of sexual harassment owing to the profile she uploaded to a dating app. She wrote a statement regarding her sexual attractiveness (e.g., I'm so hot and glamorous.) in her dating profile. Subsequently, several dating app users asked her for naked photos by praising her figure; however, with only dating profiles and a few messages, she could not distinguish that the potential partner was making risky demands. She intended to express her strength in a confident manner, but she was unable to anticipate that it could bring risky results.

Other people might think I really want to date or have sex with someone. (...) His profile was friendly, and it seemed like he wouldn't do anything bad. I didn't realize it was dangerous. I just enjoyed it because I got many "likes" from others. It's really difficult for me to distinguish these bad guys by myself. (P1)

Similar to P1, all participants had already encountered a variety of scam accounts on SNSs, and most of their parents had educated them regarding scammer traits. This drove the participants to be highly sensitive to identifying scam accounts during the dating workshop activity. Eight participants identified the scam profile we provided; in addition, nine participants recognized and rejected the scam conversation requesting money transfers. However, participants sometimes classified even the typical profile as a scammer if the profile included interests they disliked or sent messages about unfamiliar topics to them. Our autistic participants who reported having difficulties with flexible perspectives and capturing holistic impressions from others' profiles, evaluated profiles in a manner overly defensive of their own safety; consequently, they excluded potential romantic opportunities.

Overall, the scam detection activity in the workshop allowed the participants to recognize deviant behaviors in the context of online dating and prepare for handling unexpected situations in reality.

I found out that dating apps have so many different spam techniques. (P7)

Is this link a scam? Oh, that's right, clicking on a strange link. It seems to have a virus...taking my information. When I find a link, an additional link in the chat room, I should leave the chat room. (P9)

4.3 Learning about online dating norms

Throughout the dating workshop activity, the participants tried to identify the characteristics of romantic relationships that differed from the general context. Although dating apps and SNSs borrow similar mechanisms for connecting with others, the participants believed that dating apps require a different approach than SNSs because they aim to find challenging and serious relationships like "lifetime partners" (P3, P9) or "someone to marry" (P1, P2, P6, P10). They worried that the online communication practices they had acquired through SNSs would not be applicable in the romantic context, for example, that they would offend potential partners or have inappropriate conversations.

In Carrot Market (an app for second-hand items), it's just like "Hello." Then, "Is this item still available?" That's it, but this [dating app] is different. It's not about buying an item. It's about people and about love. (...) I feel more and more pressure because I have to appeal to the person I like. So, I'm more nervous. (P7)

As they were concerned, some workshop participants wrote statements that were unusual for dating situations. While presenting oneself using positive content is the basic norm in dating profiles [77, 82], many participants were also very candid regarding their negative traits in their profiles. For example, P4 described himself as "trash", and P1 wrote, "I have bad memories of my childhood, and I'm not on good terms with my parents." (Figure 3 - (B)). When talking to matched partners for the first time, some participants skipped the initial greeting and asked what they were curious about or what they thought about others' profiles: "What's the level of education you have completed?" (P8) or "You have a wide face" (P12). In addition, while chatting about the partners' interests that were significantly different from theirs, several participants directly wrote that they did not want to talk about their partners' interests and instead immediately switched the topic to their own interests.

However, many participants (P3, P2, P5, P6, P10, and P11) wanted to learn about romantic norms on the platform and to know if they were presenting themselves according to those norms to better appeal to the potential partners. They attempted to follow the unwritten rules of dating apps by making inferences about them and adjusting their behavior accordingly: "I need to be a little bit more considerate of my partners. I'm inclined to talk too much about myself, but here, I have to empathize with my partners more" (P6). For example, when rejecting partners, all participants except P11 described the reasons for their rejections in detail to be courteous to their partners, although there was an option not to reply. In the daunting task of talking about partners' interests unrelated to their own, several participants found their own approach to empathy after long contemplation, such as "I'm not interested, but I have an artistic sense, so I can take a look at it." (P8) or "What is it? I don't know, but I'll look into it when I get a chance." (P9).

Like a detour... Saying that I also had a similar experience a long time ago. If I do it like this, I guess most people will think that I sympathize with them. (P4)

Although the romantic norm that the participants identified made them try to be empathetic toward their partners, they had trouble assessing the suitability of their behavior in the context. They indicated that the lack of sufficient signals for speculation regarding their invisible partners' reactions or intentions was the primary cause of their difficulty. This led most participants to prefer interacting with a romantic partner face-to-face, even under social pressure, as they could acquire additional signals, such as facial expressions and gestures. To better manage their romantic communication in dating apps, they needed hints on whether they were responding appropriately to the context and how prospective partners might feel about the conversation.

P2: By understanding their emotional state... Because I can have an extreme conversation.

P5: So that the relationship does not become a complete catastrophe. (...) If I'm not sure what to say now, AI can

write down what fits the context.

P2: Yes. Then I can use it or not.

P5: Just show it right next to the chat window, and I will select it or ignore it.

4.4 A tension between promoting curated-self and preserving true-self

Contrary to the reported difficulty of autistic individuals in taking others' perspectives [16], some participants recognized that potential dates may not positively evaluate their behaviors on dating apps. For example, while giving feedback on each other's dating profiles, P2 and P5 reflected that the portrait-style photos they used for their profile gave the other a blunt image, making them difficult to approach. P1 wrote "unemployed" in the occupation column, and when the researcher asked why, he corrected it to "preliminary founder", saying "The other person might think I'm incompetent. I wrote "unemployed" because I'm preparing for a new job."

However, the participants did not unconditionally revise their content even if they noticed that they behaved outside the romantic norm. Some participants (P2, P3, P9, P10, and P11) mentioned that the specific interests they wrote in their profiles (e.g., games, anime, and new age music) could give a geeky or nerdy impression to prospective dates. However, they stressed that even if their interests were unattractive to most users, they would not delete or modify them, as their interests reflected their identity.

I don't want to change it (interest) for them. I want them to understand me as I am. Even if I hide it, they will eventually notice it. (P9)

In addition, four out of ten participants who revealed their autism on dating apps mentioned that disclosing autism can lower the matching probability or make them a target for malicious users. Nevertheless, they proactively disclosed their autism characteristics in their dating profiles and chat rooms (Figure 4 - (B)). They did not want to deceive others and intended to screen out prospective partners for whom autism was unacceptable.

If there is a chance, I think it would be better to disclose my autism. Because that way, I can rule out people who hate autism, and they can skip me too. (P1)

When a conflict arose between the behavior expected on the platform and participants' desire to express their true selves, the participants actively presented their unique characteristics, including autism and interests. They intended to find partners who could understand them by keeping their characteristics rather than being appealing to every user in the competitive dating market. In addition, the participants who sought advice about the unwritten rules of the platform from their parents or AI agents preferred to retain control over whether to accept that advice, as they valued maintaining their authenticity.

I wish that the AI would find a part to edit based on the profile I wrote. Something that can be regarded as unfavorable by others. But while doing that, there may be conflicts with me. Because there might be some parts that I think must be included. (P9)

5 DISCUSSIONS

In this study, we investigated the challenges and expectations of autistic individuals in online dating services. We found that autistic users have difficulties in capturing unwritten norms of the platform and subtle signals of potential partners. However, they established their own strategies for managing romantic relationships by inferring the customs required on the platforms. They then reflected on how they wanted to present themselves, how to find the person they wanted to meet, and how they could deal with various challenges and concerns in online dating. In the following section, we discuss an approach of inclusive online dating that empowers autistic users by fostering self-reflection and self-determined decisions.

5.1 Steps toward inclusive online dating with self-guided decision of autistic individuals

Inclusive system refers to a system that keeps uniqueness and embraces voices of diverse user populations [20]. It sheds light on the approach that inclusive online dating services for autistic users should allow them to pursue their unique expectations. A large body of prior research [28, 29, 66] on the online dating experiences of autistic individuals has focused on proposing competencies for making them more desirable on platforms from the perspective of the neurotypical population, such as by illustrating their personalities and showing interest in positive wording. However, our findings indicate that autistic individuals desired to express their unique characteristics without negotiating them while wanting to learn about the norm in online dating apps. From this viewpoint, following the normative behaviors of the neurotypical society in an online dating context would not lead to an inclusive dating experience meeting their expectations for romantic relationships. Then, how can online dating systems become more inclusive for autistic users who want to take the initiative in balancing between their unique characteristics and social norms?

Promoting a sense of agency when autistic people interact with various technologies or contexts (such as VR and games) is an emerging approach to reflect their opinions on technology use [43, 59, 74]. Spiel et al. [74] argued that many existing technologies are leading autistic users to learn socially acceptable practices as defined by the neurotypical society. They also claimed that technology should be developed such that it values the perspectives of autistic people, encouraging them to interact with the system or other users in a self-determined way. Another study [43] contends that inclusive VR for enhancing the work-related social skills of autistic people could allow them to make agentive decisions in potentially dangerous or beneficial situations. With this perspective, the self-guided decisions could allow autistic users to find truly desirable partners in online dating services. As such, we propose that the platforms promote autistic users to understand their needs and traits in romantic relationships and help them to take part in decision-making by prioritizing their opinions to design more inclusive online dating environments.

5.2 Opportunities to promote online dating literacy

To make self-guided decisions in online dating, one should first understand his/herself, e.g., by identifying the attributes they want

to appeal to romantic partners and the types of people they want to date. However, most autistic individuals had few opportunities to perceive their own needs and the nature of romantic relationships, as they had limited exposure to varied romantic experiences [67]. In our study, we found that autistic people gradually identified their strengths and weaknesses in the online dating context and developed corresponding strategies. Furthermore, they could even infer the implicit norms of online dating while exploring others' profiles. Similarly, Mazur [50] found that LGBTQ adults with disabilities could construct a self-identity while creating online dating profiles and perceiving the opinions of potential partners. In line with this, we put forward that online dating services have the potential to serve as practice opportunities where autistic people can make self-guided decisions while seeking potential romantic partners.

Although online dating services can help autistic individuals learn about romantic relationships, maintaining their own criteria in the system can be challenging. This is because the online dating ecology can lead users to unconsciously lose their autonomy to be more attractive to others and/or to benefit from the algorithms within the system. A previous study reported dating app users tended to self-commodify by editing their identity to exhibit themselves as more desirable in a crowded relationship marketplace [38]. In particular, Tinder users who are aware of the algorithms on the dating platform have modified their locations, ages, and even interests from the truth [53]. Given that our autistic participants showed a desire to learn the rules of online dating, it is presumable that they could compromise their unique characteristics to fit in the unwritten norms while continuing to use online dating services. Thus, it seems necessary to help autistic users avoid "negotiating" their unique characteristics owing to external factors while establishing their own standards in online dating platforms.

5.3 Design implications

In this section, we present three implications from this study, with the aim of designing a more inclusive online dating environment for fostering autistic people to make independent dating decisions. Implications were focused on application to existing online dating services rather than designing specialized services for autistic users. Our suggestions include several features for facilitating autistic users to find their standards and make self-guided decisions and a system-level approach for embracing their unique characteristics.

5.3.1 Providing supportive data as a reference for decision-making.

Throughout the workshop, participants wanted to know the romantic norms of online dating platforms even if they did not necessarily follow them. They mentioned that they should not behave as they wish and should make an effort to empathize with potential partners. They also thought understanding the subtle customs of dating apps would be necessary to protect themselves from scammers or online predators. Although they attempted to interpret implicit signals, the characteristics of online dating services can deepen autistic users' concerns about their judgment, as users can only access limited and potentially inauthentic information [30]. It led them to desire a second opinion from an outsider or technology regarding their behaviors. Thus, the system could offer supplementary data to enable autistic users to learn about the customs underlying the platform and to make informed decisions based on

them. For example, in tasks such as creating a profile or initiating a romantic conversation, the system could stimulate autistic users' thoughts by providing them with various ideas that can be used in the given context. This approach echoes previous literature that promotes data-driven reflection of autistic users by referencing behavioral data from other SNS users [15, 87].

However, the generation and presentation of supportive data must be carefully considered. If the suggestion is generated based on the data of most users on the platform, it can be biased toward the behaviors of neurotypical users, who are the majority of users on dating apps. It poses the risk of forcing normative behaviors on autistic users, thus preventing them from expressing their true selves. Therefore, the data presented should not only come from the majority of users but also include examples from the minority users within the safety-confirmed data. In addition, the way in which supportive data is presented should avoid directly showing the examples or tendencies of neurotypical users in a prescriptive manner. Instead, it should be presented in a way that respects the diversity of autistic users while also augmenting their understanding of context.

5.3.2 Facilitating self-reflection on their behavior. Perceiving one's needs and experiencing the system in a self-guided way is an underpinning to an inclusive online dating ecology. We found that questioning the reasons for the behaviors of autistic individuals could lead them to construct their own standards by reflecting on whether they are following social norms or adhering to expressing their characteristics. Therefore, we call for possibilities of prompts with question features to promote self-reflection of their online dating experiences. This will drive autistic users to ultimately make independent decisions by allowing them to define the structure of the relationship themselves and to identify their needs in a romantic situation where there is no absolute right or wrong. These prompts can be tailored to each user's behavior throughout the online dating experience. For example, the system can analyze the phrases of autistic users and display prompt questions, such as "How will your romantic partner think of this expression?" or "How would they feel about it?" When they are interested in a profile and swipe right to make a match, the system can provide a question like "Why do you think you are interested in this person?" Answering these questions themselves will serve as a "speed bump" in an online dating system that fosters simplified and fast-paced decision-making [60], giving them opportunities to reflect on the reasons for their choice.

More importantly, previous research has suggested that prompts that induce self-reflection for autistic users can have a negative impact on their self-confidence and self-esteem [44]. If prompts are designed to guide users towards specific behaviors, autistic users with cognitive inflexibility [21] might be unable to think outside of suggested behaviors and conform to them. Given the perfectionist attitude of autistic individuals [41], providing excessive self-reflection could discourage them as they strive to find the perfect answer to every question. Accordingly, the prompts should be proposed in an open-ended manner that provokes users' thoughts rather than providing explicit behavioral guidelines. It would be beneficial to present the questions at appropriate tasks or

moments, and a setting that allows users to adjust the frequency of this function according to their preferences would be required.

5.3.3 Aligning the matchmaking system with autistic users' perspectives. In Section 5.2, we noted that retaining the unique characteristics or identity of autistic users in online dating could be challenging. The algorithmic matchmaking in online dating analyzes users' behaviors and recommends potential partner profiles based thereon; thus, it is a core factor deeply related to this issue. Many dating platforms have developed algorithmic features for successful matching outcomes: displaying compatibility scores between users [24, 55] or adapting collaborative filtering for providing recommendations based on the behaviors of users with apparently similar tastes [46, 48]. However, concern has been raised regarding whether these attempts can exclude certain minority groups from the majority of users in the platform by making recommendations only among people with similar characteristics [39, 86]. In light of this, autistic users can belong to such minority groups excluded from recommendations, as the unique characteristics they want to present may differ from the preferences of the majority of users. As many online dating users put false information in their profiles for more exposure to the majority of users, autistic users could potentially negotiate or edit their identity without realizing it as they continue to use the service. Therefore, we propose allowing the matchmaking system to embrace autistic users' perspectives by recognizing their unique values and considering them as important criteria for algorithmic recommendations. It would be beneficial for not only neurodiverse users but also neurotypical users with various dating preferences and values in finding romantic partners online. The system could ask users to directly identify the factors they prioritize in a romantic context. Then, the system could actively recommend their profile to users who respect those features. Furthermore, the system can provide text that the system is looking for profiles based on the users' written characteristics but on a screen that only the user can see. These could help autistic users retain their own standard by reminding them that the system values their voice.

While the matching algorithm works by reflecting the unique characteristics of users, there is a possibility that malicious users may exploit this feature to deliberately approach vulnerable users, for example, claiming to the system that they respect the factors that neurodivergent users might prefer. Participants in our study also expressed huge concerns about their safety on the platform, and one participant was unable to distinguish users making dangerous demands on them on an actual dating app. This indicates the need for safety precautions in the system for vulnerable users, including neurodivergent individuals [5, 49, 63, 65], especially in the algorithmic recommendation and subsequent interaction stages between users. The system can provide users with warnings by detecting potentially harmful messages in the chatroom. This safety warning should be an affordance to empower the autistic users to distinguish their safety on the platform by explaining what elements of the conversation can pose a risk [4]. The algorithmic efforts may not detect all malicious attempts and respond perfectly in complex dating app environments. Nevertheless, by continuously accumulating data, such algorithms will be able to contribute to the safety of vulnerable users in the long term.

6 LIMITATIONS AND FUTURE WORK

While our work provides important design implications for fostering a more inclusive online dating experience for autistic individuals, there are several limitations. First, all participants were recruited from Korea; therefore, the cultural background of Korean autistic people may have influenced the study results. Although the sample size of our study was in line with other that of qualitative studies exploring the technology use of autistic individuals [57, 84], the relatively small sample size of our study could not represent the entire population of autistic individuals, which led to limitations in generalizing the findings of our study. In addition, it was challenging to collect the experiences of people with autism using actual online dating services owing to the social background of Korea. While autistic individuals exhibit diverse sexual orientations and gender identities [51], we were unable to recruit LGBTQ participants in Korea. Therefore, future work should uncover the inclusive issues faced in real-world online dating experiences from autistic people with various backgrounds and sexual orientations. Second, the behavioral characteristics and perceptions of the participants were elicited based on the workshop and worksheet created. There could be tasks and situations that we did not include in the workshop but would be critical for inclusive experiences. Thus, we encourage future research to further investigate the voices of autistic people in the broader context of online dating. Finally, our implications focused on facilitating autistic people to identify their own standards by facing the numerous opportunities and challenges in online dating. However, in real-world online dating services, there is a possibility that users may be frustrated by unexpected situations such as receiving harassment messages or heartbreaking rejections. Therefore, it will be necessary to consider additional features for providing a safe and sustainable dating experience. In addition, further discussions should address approaches for encouraging autistic users to keep trying to initiate romantic relationships, e.g., by informing them dating is challenging for everyone and rejection can happen to anyone.

7 CONCLUSION

This paper addressed the perceptions and expectations of autistic individuals in online dating experiences through interviews and workshops. We found that autistic individuals desire to present their unique characteristics in online dating and to decide whether they fit their behaviors to the customs by themselves. Furthermore, through workshop activities, we learned that autistic people could set their own standard by encountering numerous online dating contexts, as a form of learning by doing. We concluded with design considerations for fostering autistic people to make self-guided decisions while retaining their standards on online dating platforms. We hope that deliberating these suggestions will allow an inclusive online dating ecology that is considerate of the characteristics of neurodivergent users and supports them in finding the romantic partners they genuinely desire.

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A RESULTS OF THE ONLINE DATING WORKSHOP

Activity	Behavioral characteristics	Description	Example / Quotes
Creating a profile	Attempting to disclose as much information as possible about themselves.	Participants filled out almost every item on the worksheets and some participants added new boxes to explain about the person they admired or their family members. They believed opening up their information in the dating profile was a first step to build a trust with potential partners.	(...) My father works in accounting, and my mother worked as a kindergarten teacher for 30 years before quitting in 2015 and now working in a clothing store. (...) My mom is good at cooking, my dad is smart, and my brother likes to play games, but he listens to me. (Additional information from P10's profile)
	Actively expressing their specific interests.	Participants filled their interest keywords with an average of 10.08 and a maximum of 19 and even enjoyed writing without difficulty.	PriChan, My Mai, Chunism, Overwatch, Art, Anime, Society, International society, Chinese horoscope, Tarot card, Cute things, Clothes, Pretty things, Sanrio, Elevator, Food, Dakku, Topkku, Books (Interest from P7's profile)
	Presenting their strengths as well as weaknesses candidly.	The participants clearly highlighted their positive characteristics. However, many participants had difficulty distinguishing information that was not worthy of inclusion, so they were also very candid about the negative traits in the profile.	I'm good at counseling (...) I have bad memories of my childhood, and I'm not on good terms with my parents. (Self-introduction from P1's profile)
Browsing other's profile	Finding potential partners with similar interests.	Participants sought to find partners with similar interests, assuming that people with similar interests would be more likely to respect them.	<i>"I really liked this person, because she has the same hobby (dinosaur) as me. So I think we would hit it off well, and she would be able to respect me."</i> (P9)
	Favoring potential partners with disabilities or autism.	All participants were positive regarding those who disclosed autism or physical disability in their profiles. They inferred that those people would understand and relate to them, as they might have experienced similar circumstances and challenges.	<i>"Because we both have a disability, we can understand each other. The same is true for the profile of people with a physical disability. It's a bit different, but we can understand each other just because we all have a disability."</i> (P1)
	Sensitive to identifying scam accounts.	Eight participants identified the scam profile we provided; also, nine participants recognized and rejected the scam conversation requesting money transfers.	<i>"Money?... This is a scam. Asking for an exchange seems like bitcoin. Exchanging it into cryptocurrency and gulping it. I've seen news similar to this. It should be blocked right away."</i> (P7)
Messaging with others	Difficulty initiating the first conversation with potential partners.	As participants had little experience in leading a romantic conversation, they were baffled about even sending the first greeting messages. They also wrote unusual messages for dating context.	What's the level of education you have completed? (P8 - first message)
	Trying to understand and empathize with potential partners.	Many participants tried to empathize with their potential partner's interests unrelated to their own. Also, when they rejected the matched partners, 11 participants sent polite messages explaining the reason for their refusal.	<i>"I need to be more considerate to my partners a little bit. I'm inclined to talk too much about myself, but here I have to empathize with my partners more."</i> (P6)
	Disclosing the autistic trait and explaining it to potential partners.	Ten participants decided to describe their autistic traits to potential partners through the messages. Some participants considered disclosing their autism as a way to find a partner who could understand them.	I have an autism spectrum disorder. I can be a little bit distracted and it's hard for me to concentrate for a long time. I hope you understand these traits. (P10 - disclosing autistic features)