

Methods to reduce fraudulent participation and highlight autistic voices in research

Autism
2025, Vol. 29(4) 859–867
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DOI: 10.1177/13623613241298037
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Abstract

Alongside the rise in online qualitative research, fraudulent representation of research participants is increasing, and current strategies to address this issue within studies of non-neurodiverse samples may exclude autistic voices. Seeking to reduce fraudulent or “scammer” participation in our focus group study, and increase data validity and expenditure efficiency, we implemented strategies suggested in the literature and tested additional strategies. This research adds to the growing conversation around best practices for reducing scammers in autism research using online methods by (1) providing data evaluating the utility of existing strategies; (2) testing emerging strategies; and (3) discussing ethical dilemmas involved in addressing scammers in studies. We received over 200 expressions of interest and the established strategies suggested in the literature plus emerging strategies proved critical for mitigating the enrollment of scammers in focus groups. Protecting the integrity of data about human subjects from fraud is essential for rigorous autism research; trustworthy conclusions cannot be otherwise drawn from analysis. However, the strategies inherently require subjective decision-making that could systematically exclude participants with more limited or atypical communication and result in unfair subject selection. Procedures we recommend incur resources and are time consuming but are beneficial to ensure data integrity and inclusivity.

Lay abstract

Over the last decade, especially since the pandemic, more research has been happening online. Conducting research online can create opportunities to include autistic people across the world and make our studies more diverse. However, conducting research online had led to scammers, or people pretending to be autistic, participating in autism research studies. Strategies to stop scammers may accidentally leave out autistic people who have difficulty with processing time and open-ended questions. We tried out documented strategies to stop scammers from participating in autism research. We also tested new strategies to understand how helpful they are. Using these strategies, we suspected over 100 people who wanted to participate were scammers and did not invite them to participate. As researchers, we must ensure we stop scammers from participating in our studies. It’s important to highlight autistic voices and guarantee we get accurate results. However, the strategies to identify scammers may also leave out autistic people who have communication differences. This is unfair and could also make our results less reliable. The existing and new strategies to stop scammers take a lot of time and resources but they’re worth it to make sure our data are reliable, and include only autistic voices.

Keywords

autism spectrum disorders, bot, fraud, methods, online research, qualitative research, research participation, scam

Introduction

In-person interviews and focus groups have been the traditional form of data generation in qualitative studies, as the utility and advantages of in-person interviewing in the general population are well documented (Opdenakker, 2006). Over the past decade, though, researchers have increasingly been employing video conferencing programs

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such as Zoom Video Communications Inc. (Zoom) instead. Online programs like Zoom provide researchers with a cost-effective, convenient, time-saving, and accessible alternative for face-to-face interaction (Gray et al., 2020). Remote data collection can also be more effective in recruiting a larger number of participants from diverse and geographically dispersed populations (Gray et al., 2020). The COVID-19 pandemic led to an inevitable surge in the use of digital technologies for research due to stay-at-home orders and nationwide lockdowns (De et al., 2020). It is likely that this technological shift will prevail beyond the pandemic; thus, an exploration into strategies for ensuring the integrity of online qualitative data collection is warranted.

When conducting research with an understudied population like autistic adults, the advantages of online data collection are considerable. Prior to the pandemic, research suggested many autistic adults preferred the use of computer-mediated communication technologies (e.g. Discord, Facebook, Stream, and Zoom) in qualitative research, as they felt it supported inclusion of neurodiverse persons in social communication and offered more manageable levels of sensory input (Nicolaidis et al., 2019; Ritzman & Subramanian, 2024). During the pandemic, even more researchers opted for these online tools for data collection, thus making their research even more inclusive and participatory for autistic individuals (Realpe et al., 2023). Ultimately, continuing to prioritize online research will help to expand and diversify autism research, a field that often excludes marginalized subgroups (Cascio et al., 2021). That said, with this growth, additional attention to methodological issues related to online data collection is needed.

Alongside the rise in online qualitative research, fraudulent representation among potential research participants is also on the rise, including both *bots* and *scammers*. *Bots* encompass robots that can submit automated responses in clusters (Loebenberg et al., 2023). *Scammers* include real people pretending to meet inclusion criteria that make them eligible for a study. Two studies published in 2023 found 75–80% of expressions of research interest were from bots or scammers (Loebenberg et al., 2023; O'Donnell et al., 2023). Scammers are the primary concern for qualitative studies, compared to bots which, to date, are not known to complete interviews or focus groups (O'Donnell et al., 2023). Further, although this issue was recognized long before the COVID-19 pandemic, including in autism research (Harrop et al., 2021), the pandemic accelerated digital transformation such as online processes, which in turn brought more intelligent schemes of fraud activities (Zhu et al., 2021). This escalation has a substantial impact on researchers' initial fraud detection and prevention strategies, forcing innovative but potentially disparate ways to respond to more complex and hidden scammers and fraud.

Several research groups have recently published recommendations and strategies for protecting online data

from bots and scammers (Storozuk et al., 2020; Woolfall, 2023). For example, Storozuk and colleagues (2020) analyzed recommendations from the literature and found that the most effective strategies for detecting fraud were: screening email addresses (e.g. for repetitive patterns); screening open-ended responses and reverse-scored items; using individual, rather than publicly shared links; monitoring time of survey completion; and monitoring speed of survey completion. These strategies, however, were created with the general population in mind, rather than neurodiverse groups. Some of these strategies may erroneously exclude authentic autistic adults, such as those who have difficulty with open-ended questions or require additional time processing questions and may introduce further bias within recruitment. Thus, use of these strategies with neurodiverse participants requires careful consideration.

In May 2023, Pellicano and colleagues (2024) published a letter to the editor that cautioned autism researchers to be vigilant against potential scammers, who may pose as autistic people and/or parents of autistic people, in their online studies, presumably for financial gain. Their team developed a list of strategies for keeping research inclusive while also dissuading scammers, and the article discusses both the advantages and disadvantages of implementing each suggested strategy in their first table. Throughout the process, they recommended taking in-depth reflective notes and meeting regularly with the broader team to debrief and discuss concerns. As they noted in the editorial, there are pros and cons to each strategy, and ensuring data integrity without limiting genuine participation is complex and requires tradeoffs that vary based on the research question, research team and community partner priorities, and available resources. It is therefore integral that researchers continue to expand and refine online qualitative methodologies for verifying autistic participants.

In late 2023, we began recruiting for an online focus group study regarding autistic experiences during the transition to adulthood. With an eye toward reducing scammer participation in our study, we implemented strategies suggested by Pellicano et al. (2024) and added strategies being utilized by our network of autism research colleagues. Because there are no published studies evaluating the results of such strategies in autism research, our objectives for this study were: (1) to provide data to evaluate the utility of the strategies suggested by Pellicano et al. (2024); (2) to suggest additional strategies to be considered for recruitment in online autism research; and (3) to discuss the ethical importance of the due diligence required when recruiting autistic participants, particularly when using online methods.

Methods

Overview of participant verification process

We implemented a multi-stage and multi-step process to identify possible scammers. We modeled our process on

strategies recommended by Pellicano et al. (2024) and made adaptations based on considerations appropriate for our focus group study, as described in the “Participant verification stages” section. We quickly identified the inherent judgment and subjectivity required during participant verification and thus engaged in a team-driven consensus process throughout study stages to build consensus around our decisions.

In addition, at all stages of the study we were clear in our communication to interested participants that we were employing scaffolding throughout our study to identify fraudulent participants. Our intention here was to provide context to the autistic community to explain why we were employing multiple steps for our focus group study, which is especially important since additional processes may pose a barrier to participation or loss of interest. Throughout the process we consistently communicated that we were available to support potential participants to facilitate this process for them.

Participant verification stages

Recruitment. The Drexel University Institutional Review Board approved this study (protocol number 2302009725). For our focus groups, we were particularly interested in highlighting autistic voices from groups often underrepresented in autism research, including people who identify as either LGBTQIA+, people of color, female-identifying, or non-speaking. For recruitment, Pellicano et al. (2024) suggested restricted or closed recruitment from social media, as well as constructing recruitment materials with generic terms for compensation. To that end, we limited our use of social media for recruitment to Twitter (now, X), and instead employed a combination of outreach efforts including listservs from our organization and from community collaborators. We did disclose that study incentives were available in our outreach methods, but to avoid drawing attention to potentially fraudulent participants who were solely interested in monetary compensation, we did not mention the method of compensation or amount (e.g. “participants will be paid”). We did not inform participants about the nature and amount of compensation until they reached the screening stage.

As expressions of interest from our recruitment efforts arrived via email, a study team member was responsible for monitoring the inbox for suspicious activity, such as: (1) duplicated email addresses and (2) emails that arrived in batches (e.g. 3+ messages) with minimal language changed between the messages. Expressions of interest that met either of these criteria were not followed up with because of suspected fraud. Most commonly, we received single email messages with “boilerplate” expressions of interest that gave no information about the person or their interest in the study—see Table 1 for examples. These expressions of interest, though vague, were not automatically excluded

Table 1. Examples of “boilerplate” expression of interest that were assessed by the study team but not flagged for fraudulent activity.

Message
“I’m interested in your study sending from my iPhone”
“Am willing to participate in your studies”
“I have the willingness to participate in your studies”

Table 2. Examples of expression of interest emails from participants who later engaged in focus groups, and endorsed that they were autistic.

Message
“Hi! I am reaching out to express interest in participating in the autism transition research. I am 20, my own legal guardian, and queer.”
“Hello, I’m interested in participating in your Informing National Autism Transition Research Agenda research study. If the study is still available, I’m interested in finding out more about it and possibly participating. I’m an [STATE] resident, so my time is [NAME]. My phone number is [NUMBER]. I prefer email as means of primary communication.”
“Hi, I got an email from [NAME] about an autistic adult focus group opportunity. I was interested in learning more about that, and if I meet the criteria even if I do not have an official diagnosis done through testing. Thanks, [NAME]”

because of the concern that disqualifying participants based on grammatical issues, or using an automated response suggested by their cell phones, could potentially differentially exclude individuals with varying levels of literacy and cognitive abilities. In contrast, Table 2 provides expression of interest emails sent by three autistic focus group participants to compare the types of emails sent by actually autistic individuals. In general, these emails were much more detailed and, at times, gave personal information about the person who was interested. However, as long as expressions of interest did not meet criterion 1 or 2 mentioned above, we distributed a unique link to a screening form hosted by Qualtrics to assess eligibility as well as participant legitimacy. The use of unique links to the screening form was also a preventive measure to avoid mass distribution of a public link.

Screening phase

Review of screening form. After participants completed the screening form, which is provided in the Supplemental Material, we conducted a review of the responses and survey completion metrics. To indicate our hesitancy about a potential participant while reviewing the screening form and beyond, we implemented a three-tiered “flag” system where we assigned participants either a

red, yellow, or green flag based on the criteria described in detail below. Green flags were assigned when no concerns were raised about the participant's provided information. Yellow flags were assigned when some concern was raised but it was not clear-cut—these were typically subjective in nature such as a response to an open-ended question that was inconsistent with the autistic lived experience. Red flags were assigned if potential participants clearly met one or more of our established fraud criteria below. Individuals with one yellow flag could continue through the eligibility determination process, but we did not continue the screening process for those given two yellow flags or one red flag.

Red flags: CAPTCHA. When beginning our screening form, participants were prompted to click a check box that displayed the message “I am not a robot.” Then, they were prompted to identify objects in a grid of images that was auto generated (e.g. select all boxes with traffic lights). We reviewed the CAPTCHA scores generated from this procedure, as suggested by Pellicano et al. (2024). CAPTCHA scores serve as an indicator of the likelihood the respondent is a scammer with a range from 0.0 to 1.0 where higher scores generally indicate reliability, and lower scores raised scrutiny. We set our default cutoff at 0.5; those scoring at or below 0.5, including those who did not register a score, received a red flag and were not followed up with.

Red flags: IP address. Next, we reviewed respondents' IP address (as suggested by Pellicano et al.). Given that our study required residency in the United States, one of the screening questions asked respondents to specify their place of residence. IP address was collected by Qualtrics, and we used freely accessible, online tools to map the location of the IP address (e.g. whatismyipaddress.com). Those whose IP address was within the United States received a green flag for this criterion; those whose IP address was outside of the United State received a red flag and were not followed up with. Responses with no recorded IP address were also assigned a red flag and excluded as well.

Yellow flags: write-in response. Pellicano et al. (2024) also indicated that screening forms should require participants to include a brief description of themselves. We adapted this recommendation in two ways. First, we did not require participants to complete this question. If the participant didn't answer, Qualtrics (the screening form host platform) issued a reminder to participants to complete the response, but the participant could ultimately submit the form without completing it. Second, rather than a brief description of themselves, we posed a study question that was specific to the research topic, asking interested participants “What do you think people should know about the transition to adulthood?” After reviewing responses to the screening form, respondents were then given either green or yellow flags, depending on the response provided. Two examples of a response that generated a yellow flag were:

“Autism a difficult medical condition” and “I can overcome my autism,” because they denote responses not aligned with the preponderance of perspectives from autistic individuals.

Pre-focus group interview. The participants who remained eligible after the screening form were contacted for the final stage of screening, which included a pre-interview briefing via videoconference. A team member scheduled a virtual screening session with each eligible participant to establish participant credibility and conduct consent. All participants provided verbal informed consent. Prior to the consent portion, the interviewer asked open-ended questions about their experience as an autistic young adult and assessed the quality and plausibility of their responses using the same green and yellow flag process for write-in screening form responses. We also required the participants' camera be on momentarily to verify identity consistent with the screening form. During this time, the interviewer also took notes about the individual's surroundings (e.g. time of day to see if it matched the time zone stated on the screening form). Those who refused to turn their camera on were given a red flag. Following each pre-interview briefing, the interviewer would inform the study team about the interaction and discuss any yellow flags that arose from the open-ended response or if the time of day did not correspond with the participant's stated geographic location. After reaching group consensus, we only proceeded with those who had green flags across all participant verification stages, or at most one yellow flag, and invited those individuals for participation in our focus groups.

Data collection phase. Our final effort to identify scammers occurred during the focus groups. We required participants' cameras to be on during the beginning of the focus group, and a team member confirmed this person was the same person that consented. Participants could then decide whether to turn off their cameras or leave them on for the remainder of the focus group.

Community involvement

Relevant to the recruitment and eligibility determination process for our focus group study, autistic researchers were involved in many aspects of the study including the study design, measure development for the screening form, study implementation, and interpreting and disseminating the findings, as well as manuscript development.

Results

A schematic depiction of our recommended process, the sample inclusion and exclusion criteria, and the associated sample sizes is provided in Figure 1. Of the 215 individuals who responded to our recruitment efforts,

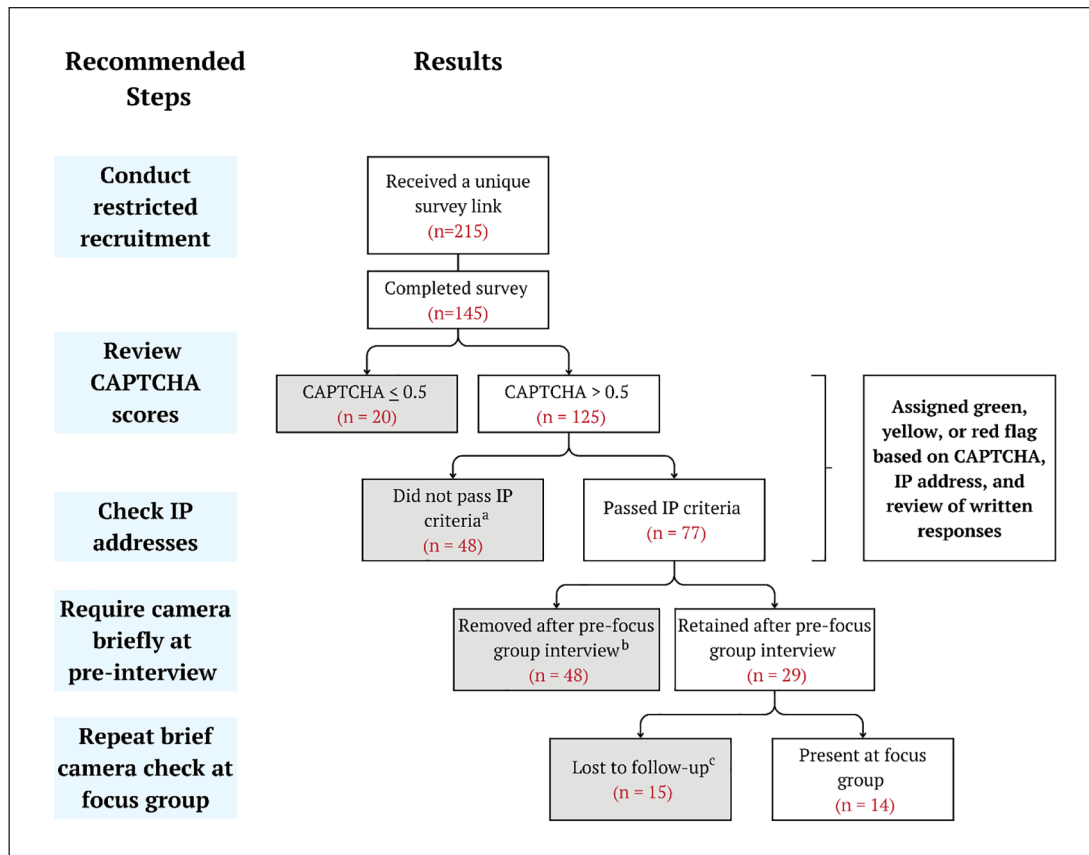


Figure 1. Flowchart depicting participant inclusion and exclusion criteria with sample sizes.

^aAmong the 48 responses excluded because of IP addresses, 36 IP addresses (75%) did not match the country of residence provided on the screening form, 9 (19%) were used for another survey response (suggesting duplicates), and 3 screening forms (6%) had no IP address recorded.

^bAmong the 48 excluded after pre-focus group interview, 37 (77%) were screened and disqualified because of suspicions of fraud, while 11 (23%) were non-responsive to our request to schedule the pre-focus group interview.

^cAmong the 15 lost to follow-up, 13 (87%) were non-responsive to our request to schedule the focus group, while 2 (13%) were scheduled but ultimately did not show up to our focus group.

and received a personalized survey link (i.e. their emails did not indicate suspicious activity), 145 completed the screening questionnaire (67%). Among the respondents, 20 (13.8%) displayed a low or non-existent CAPTCHA score, consistent with bots, which led to their automatic elimination. Thus, 125 participants remained eligible, with no immediate indications of fraudulent activity. The IP addresses of 36 screening form respondents (28.8%) were outside of the United States, though they had indicated they resided within the United States on the screening form and were excluded. Nine of the 125 screening form respondents (7.2%) were disqualified because their IP addresses were redundant with previous survey respondent IP addresses, and three additional respondents lacked an IP address, which also led to their exclusion. Cumulatively, a total of 46.9% of the 145 individuals who completed the screening form ($n=68$) were excluded as suspected fraudulent participants during this screening stage. This did not include those excluded due to suspicious email activity (i.e. batch

emails, not enumerated), and it was impossible to enumerate suspected fraudulent activity from the individuals who expressed interest but never completed our screening form. After reviewing screening form responses, 77 potentially eligible participants (53.1% of those who completed the screening form) remained.

We then reached out to the remaining 77 eligible participants to set up our virtual, pre-focus group interviews via Zoom where participants were told they would be required to turn their cameras on at least briefly. Eleven individuals (14.3%) did not respond to this request, and we scheduled pre-screening interviews with the remaining 66 eligible participants. The parts of this interview included posing an open-ended prompt (e.g. "Please tell me why you want to participate in our study"), asking participants to turn their cameras on for a brief check-in, and then reviewing the consent form with cameras on or off depending on participant preference. Team members conducting pre-focus group interviews took notes on the participants' responses, whether they turned their camera on when

promoted, and a brief description of the person and what else could be seen while the camera was on (i.e. the room was dark).

The pre-focus group interview resulted in the disqualification of 37 eligible participants (56.1%) because of suspicions of fraud. Many respondents were assigned yellow flags to their response to the open-ended prompt because they provided vague or inconsistent answers to our prompts. For example, when asked why they wanted to participate in the study, some eligible participants didn't mention that they were autistic or their experiences with the transition to adulthood. Comparatively, participants who received green flags spoke at length about challenges encountered during the transition to adulthood. Some responses included challenges around receiving their autism diagnosis at this time and the difficulty peers created during high school, and a handful also provided details about other autism research studies they participated in previously (e.g. SPARK). After reviewing the prior eligibility criteria assessed for fraud, many of these respondents who were flagged for questionable responses to our open-ended prompt had accumulated two yellow flags; nonetheless, these participants were then brought up for group discussion along with those with one yellow flag. When consensus was reached, we were left with 29 eligible participants. Thirteen of the 29 eligible participants (44.8%) either did not respond to an email about scheduling for the focus group or their schedules did not align with the pre-scheduled date and time of the focus group. Our efforts resulted in 16 people screening eligible for the focus group and agreeing to participate, and 14 who ultimately participated.

Our screening form was purposely formatted to ensure focus group-related questions were answered before demographic questions, to safeguard against participants reaching survey fatigue for necessary screening questions (see Supplemental Material for Screening Form). Among the 14 focus group participants, 10 responded to our questions around demographic characteristics. Of those who responded to demographic questions, 90% identified as LGBTQIA+, 63% identified as gender minorities (e.g. non-binary), 28% identified as people of color, and another 28% went to high school in areas of high poverty. Of note, we did not ask participants their age, but participants had to identify as being between 18 and 29 years old to be considered eligible for our study.

Discussion

Our participant recruitment and screening process involved a series of successful measures to ensure the quality and authenticity of respondents. By merging targeted outreach, collaboration with community members, and snowball sampling, we effectively reached various groups of autistic young people underrepresented in research. The usage and

distribution of unique screening links and the subsequent review of respondent CAPTCHA scores helped eliminate potentially fraudulent responses. In addition, our team carefully reviewed IP addresses, disqualifying those from countries outside the United States (consistent with our eligibility criteria) and those with repeated or redundant IP addresses, which also resulted in the dismissal of nearly four dozen potentially fraudulent participants. These first steps were crucial in weeding out many scammers, reducing the need for virtual screening of all candidates and saving our team considerable time. However, pre-focus group interviews via videoconferencing were the most successful measure screening implemented, as suspicious activity was identified in more than half of all eligible participants that remained. Nonetheless, this comprehensive approach allowed us to overcome the potential of collecting inaccurate data to gather valuable insights from a diverse and genuine participant pool.

We believe the virtual screening pre-focus group interviews were the most successful in identifying scammers because it required engagement in face-to-face communication with otherwise eligible participants, albeit through a virtual platform. As researchers who either are autistic or have conducted many studies with the autistic community, meeting face-to-face allowed us to better understand the participants' lived experiences and their communication style and to see if that was consistent with our understanding of autism. We also assessed minutiae like the time zone with which they were speaking to us from, and whether the time of day where they were matched their stated location. Also, most people genuinely interested in engaging with us face-to-face willingly kept their video cameras on throughout our conversation. However, we acknowledge that preferences for on-camera participation may vary by a multitude of factors and do not call for this as a requirement for successfully identifying fraudulent participants. Critical to this stage was the in-depth team discussions and consensus building following virtual interviews because of subjectivity required in identifying fraudulent participants. It's possible that more scammers could've been identified through our recruitment efforts—if we had flagged participants with boilerplate email responses—or through our screening form, which would result in those stages of screening having more success. For the latter, it is also possible that international fraudulent participants used virtual private networks (VPNs) to establish IP addresses that were U.S.-based although they were located internationally. However, we are unaware of solutions for identifying when VPNs are used to establish an alternative IP address.

At each step of recruitment and screening, we reiterated in verbal and written communication to participants that we were making efforts to avoid fraudulent responders, which has the intrinsic potential to deter fraud, though we could not quantify the extent to which this deterred fraudulent participation. For example, about 13% of participants who

screened eligible after completing the Qualtrics screening form did not communicate with us after learning there would be a pre-focus group interview to ensure authenticity of participants. Ultimately, we believe setting some prior guidelines to identify fraudulent participants is necessary to running a successful study. While formalized feedback on the screening process was not systematically collected during this study, participants expressed a general understanding of and compliance with the necessary steps involved. Future research should consider implementing structured feedback mechanisms to gather participants' perspectives on the screening process, which could provide valuable insights into enhancing the efficiency and participant satisfaction of such procedures.

Ethical considerations

In their seminal paper "What makes clinical research ethical?" Emanuel and colleagues (2000) propose seven requirements for evaluating the ethics of clinical research studies. Among these, requirement 2—that the research is methodologically rigorous—and requirement 3—fair subject selection—may conflict with online research, particularly with autistic participants. On the one hand, high rates of fraud in paid online research studies require researchers to enforce stringent eligibility procedures, such as those described above, to ensure the integrity of their data. On the other hand, the more stringent the eligibility procedures are, the more likely they are to exclude legitimate potential participants for reasons unrelated to fraud but potentially related to disability (e.g. difficulty with executive function, or providing brief and/or unexpected responses to open-ended screening questions). Thus, there is a tradeoff between two of the ethical requirements that guide our work, and this tradeoff requires consideration and dialogue among the study team, as well as the greater autism research community.

Though we were ultimately successful in hosting focus groups without scammers, it is possible—and even likely—that we unintentionally excluded some autistic participants we had flagged as scammers through this process. Further testing of the validity of these recruitment and screening methods is needed, including an investigation into the extent to which these strategies lead to selection bias. For instance, a recent review of autism research has indicated frequent selection bias against autistic adults with co-occurring intellectual disability (Russell et al., 2019). Causes of selection bias in autism research can include difficulty in recruiting those with less access to services, potential participants having a limited cognitive capacity to consent, or only allowing for verbal consent and excluding those who are non-speaking (Russell et al., 2019). Further, methods that require open-ended responses can bias toward selecting only those with strong expressive language skills. As

such, results can be biased and lack generalizability to all autistic people. We recognize that autism is a spectrum that is experienced differently by different people. Thus, we cannot propose a perfectly unbiased strategy. There are also long-standing and pervasive power issues in autism research with frequent disconnects between researchers and the autism community (Keating, 2021; Pellicano & Stears, 2011). Ultimately, we encourage researchers to critically evaluate which strategies will work for their study population, to implement accommodations from the onset, and to include autistic collaborators in every stage of the research process, including those with higher support needs, whenever possible.

A second ethical dilemma related to the current study concerns whether it is ethical to publicize our strategies for managing fraudulent responses at all. Our team considered and discussed this dilemma extensively before deciding to move forward with publication. On the one hand, published work on how we identify and eliminate fraudulent responses can be discovered by individual scammers and organized scamming industries who can then learn from and modify their own strategies in response. On the other hand, *not* publishing strategies makes it harder for the research community to evolve quickly to mitigate threats. Indeed, our team has learned about both the extent of scamming threats, and how to manage them, from the published work of others (Griffin et al., 2022; Pellicano et al., 2024). It may be worth considering a parallel problem from the field of software development, in which vulnerabilities within open-source versus closed software have consistently found little difference in the *number* of vulnerabilities, but a *faster response* to them, in open-source software (Schryen, 2009). Although unknown, it is possible that a similar pattern could be seen with respect to research scamming—similar rates of fraudulent responding regardless of published strategies for managing fraud, but slower adjustments within the field if methods and strategies are not shared openly. Of course, it is also quite possible that methods papers such as this one will educate scammers as much as they educate researchers, which is a dilemma we openly acknowledge.

Future directions

Since engaging our study participants, our colleagues have begun to include language in consent forms stating that participants suspected of fraud will not be eligible for compensation, and their data will be removed from study analyses. While we did not include this specific strategy during our study, we believe this could be another successful tactic in dissuading scammers in autism research to protect our data integrity. Thus, we have begun implementing this strategy in our other studies. In addition, artificial intelligence (AI) could become a tool for fraudulent participants in qualitative studies or those using chat functions, though its utilization was not considered in this

study, as nearly all participants responded verbally in our focus groups. However, as AI develops at an expedited pace, we anticipate its usage to generate written answers to research questions will also expand. If not already underway, developing methods for identifying AI-generated answers will become a necessary integration for researchers engaging in online, qualitative research.

Conclusion

Protecting human subjects' data from fraud is essential for rigorous autism research. When researchers cannot trust their data, they cannot trust conclusions drawn from its analysis. In our work, we have found that a multi-step, multi-stage strategy was effective at discouraging and identifying scammers seeking to participate in a focus group study. This strategy encompassed email screening after recruitment, careful review of technological (e.g. CAPTCHA, IP addresses) and self-reported elements contained in a screening survey, and a face-to-face pre-focus group eligibility interview conducted virtually. Ultimately, we believe that our final sample included no bots or scammers and can be considered fully trustworthy, although it is possible that we unintentionally excluded some autistic participants.

Some of the procedures we implemented and recommend (in particular, the pre-focus group interviews) are time consuming, but ultimately worthwhile, because without them we could have collected useless data. We recommend that researchers plan and budget for these additional time consuming but necessary steps in their research process when conducting online research, whether using quantitative or qualitative methods. To identify our 14 legitimate focus group participants, we estimate that our total screening process required 10–15 hours of work per week to implement over the course of approximately 8 weeks. This is not inclusive of the time needed for the creation of our screening form and tracking spreadsheets, or recruitment efforts. Further, some steps in our process require subjective decision-making. These steps require special scrutiny because of their potential to systematically exclude participants with more limited communication skills and could result in unfair subject selection. Some guardrails we recommend for increasing inclusivity while maintaining rigor are: frequent communication within the study team (ideally including autistic researchers) and offering accommodations to support participation. Overall, we recommend that alongside the implementation of these strategies there is continuous dialogue within and between research teams as researchers expand their toolkit for conducting inclusive, accessible, and rigorous research with autistic samples.

Across interactions with participants, our team communicated clearly that we were actively seeking to identify and eliminate scammers from our study sample. However, we did not have any procedures in place for withholding

compensation from participants identified to be scammers should those individuals make it past our screening steps and into the focus group itself. We strongly support collaboration and sharing of materials and language to facilitate ethical management of fraud, and indeed, we encourage readers to reach out to us so that we can share our own materials with other researchers who are getting started in taking these steps. As noted by Harrop and colleagues (2021), an *INSAR* special interest group could be a valuable tool for both resource sharing and raising awareness about the benefits and risks of online data collection.

Finally, we hope that journal editors and reviewers are aware of the potential for fraudulent data in both quantitative and qualitative research, and the challenges it poses to data integrity. We encourage peer reviewers to evaluate procedures (or lack thereof) for minimizing fraudulent responding as part of their review process.

Acknowledgements

The authors would like to thank Dr. Dora Raymaker for their input on an earlier draft of the manuscript and Dr. Lindsay Shea for her review of this article.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This project is supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) under cooperative agreement UT6MC45902 Autism Transitions Research Project. The information, content, and/or conclusions are those of the author and should not be construed as the official position or policy of, nor should any endorsements be inferred by HRSA, HHS, or the U.S. Government.

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Supplemental material

Supplemental material for this article is available online.

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