



Unlock Life with a Chat(GPT): Integrating Conversational AI with Large Language Models into Everyday Lives of Autistic Individuals

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ABSTRACT

Autistic individuals often draw on insights from their supportive networks to develop self-help life strategies ranging from everyday chores to social activities. However, human resources may not always be immediately available. Recently emerging conversational agents (CAs) that leverage large language models (LLMs) have the potential to serve as powerful information-seeking tools, facilitating autistic individuals to tackle daily concerns independently. This study explored the opportunities and challenges of LLM-driven CAs in empowering autistic individuals through focus group interviews and workshops (N=14). We found that autistic individuals expected LLM-driven CAs to offer a non-judgmental space, encouraging them to approach day-to-day issues proactively. However, they raised issues regarding critically digesting the CA responses and disclosing their autistic characteristics. Based on these findings, we propose approaches that place autistic individuals at the center of shaping the meaning and role of LLM-driven CAs in their lives, while preserving their unique needs and characteristics.

CCS CONCEPTS

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



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KEYWORDS

conversational agent, large language model, autism, participatory design workshop

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1 INTRODUCTION

Conversational agents (CAs) that leverage large language models (LLMs), exemplified by ChatGPT, are gaining attention as powerful information-seeking tools for autistic individuals¹ [48]. By simply typing a query to LLM-driven CAs, autistic individuals can easily access vast information anytime and anywhere whenever they face unexpected daily challenges [58, 83]. Moreover, it can deliver personalized responses that accommodate specific traits and intentions of autistic users through its advanced context analysis [21, 95]. With such capabilities, LLM-driven CAs hold promise for autistic individuals to navigate everyday life independently, ranging from everyday tasks and self-care to social interactions [64, 75].

However, coping with day-to-day activities through conversations with LLM might have negative impacts on autistic individuals. Assessing the appropriateness of LLM's advice on social communication would be challenging for autistic users who often struggle to cope with implicit social norms [4]. While some studies suggest

¹There is ongoing debate regarding how to describe autism. In this paper, we opt for “identity-first” language (i.e., “autistic individual”) instead of “person-first” language (i.e., “individual with autism”). This choice reflects preferences of autistic people [59] and recent academic trends [11].

that LLM-driven CAs can facilitate mental wellbeing in autistic populations [48], their lack of sensitivity to subtle emotional cues and risky signals might lead to harmful outcomes [26, 52]. Furthermore, previous research has reported that LLMs, in conversations with users with disabilities, portrayed them as people needing help or wanting to be “fixed” [33]. LLMs’ responses with biased perspectives might hurt autistic users or lead them to make decisions that do not respect themselves.

Given the undeniable wave of LLM-driven CAs rapidly integrating into our lives globally, it is not feasible to simply limit their use for autistic individuals because of the expected drawbacks. Therefore, proactive efforts are needed to augment the benefits and address the disadvantages of this technology to empower the autistic population. However, in the early stages of adoption, the in-depth voices of autistic individuals regarding the impact of incorporating LLM-driven CAs in their daily lives remain largely unexplored.

With this background, we aimed to explore the perceptions of autistic individuals toward LLM-driven CAs and characterize their expectations and challenges in using them as they navigate their everyday lives. We conducted a series of focus group interviews and workshops in which 14 autistic individuals ideated the application of LLM-driven CAs in daily contexts by interacting with ChatGPT. Our findings indicate that LLM-driven CAs can serve as supportive partners for autistic individuals in independently addressing day-to-day activities and advocating for themselves. Simultaneously, we captured the challenges associated with self-directed technology adoption, over-reliance, and disclosure of autistic identity. Drawing on our findings, we propose forward-looking recommendations to facilitate the critical engagement of autistic users with LLM-driven CAs with a sense of agency.

The contributions of this work include the following: 1) an empirical study to understand the opportunities that LLM-driven CAs can offer in facilitating the independent lives of the autistic population from their perspective; 2) the identification of challenges arising in adopting LLM-driven CAs as empowerment tools for autistic users; and 3) the proposal of recommendations to foster an inclusive LLM experience for the neurodiverse population.

2 RELATED WORK

2.1 From CMC to LLM: Leveraging digital technology to empower autistic individuals

Autistic individuals may sometimes face challenges when it comes to organizing, initiating, and generalizing information and actions [16], which can potentially impact their sense of self-determination [49]. As a result, many individuals have turned to trusted caregivers, such as parents or family members, for valuable guidance in navigating the numerous daily challenges they face [79]. Nonetheless, such human resources may not always be readily accessible for immediate consultation, and significant dependence can impose a substantial burden on them [64]. A limited support network also restricts autistic individuals from broadening their social relationships or accessing a wide range of viewpoints [12].

The advent of the Internet has fostered online support networks beyond the physical environment for autistic individuals. A trustworthy, responsible circle of family, friends, and acquaintances (e.g.,

neighbors) supported by a commercial social networking service encourages greater social interactions while decreasing the reliance on seeking advice inordinately [46, 47]. In an ethnographic study focused on an online Minecraft community for autistic children and their families, researchers explored the idea that autistic children could establish and engage in social interaction within a virtual environment, potentially leading to improved offline social engagements [86]. Autistic people have found strangers online are a viable source of support. Computer-mediated communication (CMC) provides autistic individuals with an opportunity to initiate supportive relationships online by reducing social pressure, as explained by Burke et al. [15]. Online relationships, however, have been hindered by fear of victimization and misunderstandings caused by unfamiliar CMC-specific norms [15]. Researchers have investigated how crowdsourcing can meet the needs of autistic people by providing them with diverse advice on everyday problems [45]. This study found that crowd workers provided quick and immediate responses to autistic requesters, broadening their perspectives. For the effective integration of anonymous online resources, systemic measures are required to ensure the credibility and safety of responses from those outside the autistic community.

Artificial Intelligence (AI) and Natural Language Processing (NLP) have opened new pathways for autistic individuals to address their daily challenges [32]. AI-based CAs have been developed for this population to support or practice a wide range of daily tasks, including establishing a home oral care routine [80], handling school bullying [54], and managing depression [41] and anxiety [78]. More recently, studies have explored the potential of leveraging AI for open-domain dialogue, empowering autistic individuals to engage proactively in conversations about their everyday concerns. Cha et al. demonstrated that an AI-based VCA can serve as a conversational partner for autistic adolescents, meeting their various daily needs, including sharing interests, managing daily routines, and practicing communication skills [17]. Another co-design study revealed that autistic college students are interested in the multifaceted use of AI-driven CAs, encompassing aspects such as academics, health, and social interactions [17]. Despite the identified needs, AI-driven CAs up to this point have fallen short of addressing the unique and diverse needs of the autistic people, largely owing to their constraints of pre-defined conversational flows [66].

With the ability to engage in open-ended conversations similar to human interactions, newly developed LLMs are now proving to be useful tools for autistic individuals in the search for information. Combined with large-scale pre-training, users can easily access a wealth of organized information through the LLM [58, 83]. LLM also provides relevant and coherent responses by considering the surrounding context of a conversation or query [5, 14, 74, 87, 111]. In particular, in the form of a chatbot, LLMs use an instruction-tuning process to learn what users want, aligning the model with their specific needs [14, 106]. Owing to their superior accessibility and adaptability [114], LLM-driven CAs hold potential as a new medium to empower autistic individuals to tackle everyday issues. While there are anecdotal pieces of evidence—such as articles [23, 48], Reddit communities [84], and blogs [92]—documenting the experiences and opinions of autistic individuals using LLM-driven CAs, there is still a scarcity of in-depth research examining the

tangible benefits these tools could bring to the lives of autistic people.

2.2 Inclusive LLM experiences for autistic individuals

Propelled by research examining AI bias related to gender and race [9, 34, 42, 63, 72], recent years have seen growing attention to AI's inclusivity toward identity-based minority groups, such as people with disabilities [38–40, 51, 96, 99, 101, 109] and LGBTQ communities [27, 82, 103]. The increasing interest in AI inclusivity aligns with the growing scrutiny of LLMs, particularly regarding interactions with minority users. Owing to the extensive human-generated text on which LLMs are trained, there is an inherent risk of perpetuating conversations that are unintended or unanticipated by chatbot designers [5]. One of the most active areas of research is the harmful dialogue produced by LLMs, which often originates from biased data or inadequate data representation [7, 10, 18, 30, 35, 37, 107, 116]. Several studies have discovered that language models such as GPT-2 and BERT can produce biased or offensive texts, particularly affecting historically disadvantaged groups [7, 28]. A focus group study by Gadiraju et al. [33] explored interactions between people with disabilities and LLM-driven CAs, specifically discussing disability-related topics. The study found that LLM-driven CAs frequently portray people with disabilities as either sorrowful beings in need of assistance from able-bodied individuals or as marginalized figures with compromised autonomy. Just as people with disabilities feel that LLMs violate their autonomy and normalize their exclusion, there is a potential risk that autistic individuals could either be harmed by discriminatory perspectives in LLM-based dialogues or may not recognize such biases.

Another critical issue surrounding inclusivity is the potential of LLMs to exert subtle psychological and social effects on users, even without explicit toxicity. Notably, LLMs can produce hallucinations that sound credible but are factually incorrect [30], posing particular risks in scenarios, such as seeking medical information without expert consultation [89]. For autistic users who find it challenging to navigate subtle social norms, differentiating between these hallucinations and reliable information can be particularly challenging, leading to misunderstandings and further social conflicts. Previous research has also highlighted the detrimental effects of overreliance on LLMs in educational and workplace settings [25, 36], suggesting that it can impede users' problem-solving abilities [55]. This habitual acceptance of LLM responses could make it difficult for autistic users to critically engage with the information provided, thereby compromising their ability to make informed decisions [102].

Despite the aforementioned potential risks that LLM could pose in the daily lives of autistic individuals, there has been limited research on the unique challenges and experiences that this group might encounter. Numerous assistive technologies have addressed this issue by providing specialized platforms or safeguards specifically designed for autistic users, such as exclusive online dating services [2, 43] and moderated online communities for young autistic adults [1]. However, in the field of LLM, the advent of universally accessible and increasingly popular services such as ChatGPT has blurred these boundaries. Many autistic adults are already using these general platforms, thereby making the previous "separate but

safe" approach less relevant. In light of this, rather than developing exclusive platforms or safety AI filters for autistic users, we aimed to explore the unique opportunities and challenges they experience on mainstream LLM platforms.

3 STUDY DESIGN

This study aims to explore the opportunities and challenges of using LLM-driven CAs in the everyday lives of autistic individuals. To this end, we conducted focus group interviews to examine the participants' perceptions of LLM-driven CAs. We then held individual workshops in which participants devised their own strategies for using LLM-driven CAs to address their everyday needs and concerns. In this study, we selected ChatGPT as the representative LLM-driven CA platform due to its high accessibility and current popularity.

3.1 Participants

Participants were recruited based on the following criteria: 1) diagnosis of Autism Spectrum Disorder, 2) ability to communicate and comprehend the interview questions provided in the study, 3) willingness to use LLM-driven CAs, and 4) ability to use digital devices such as computers or smartphones. In the flyers, we articulated that the study aimed to explore ways of integrating ChatGPT into the daily lives of autistic individuals. Additionally, we provided details about the participation period, the procedure of the study, and the activities involved. These flyers were distributed to potential autistic participants who met our criteria through the Center for Autism Education and Support in Korea, where one of the authors is affiliated. As a result, a total of 14 participants responded that they were interested in the study and provided written informed consent.

The participants were aged between 18 and 37 years (mean=23, SD=5.94), and included 11 males and 3 females. The participants' gender balance mirrors the diagnosis distribution reported in previous literature, showing a male-to-female ratio between 4–7.38 and 1 [6, 108]. Six participants, including three majoring in engineering, had previous experience using ChatGPT. Among them, four participants identified that they often used it more than three times a week, while two participants identified that they occasionally used it approximately once a week. None of the participants used the paid version (model GPT-4). The remaining seven participants mentioned that they had heard of ChatGPT, but had no experience using it. All participants were Korean and were compensated with 100,000 KRW (equivalent to \$80 USD) for participating in both the focus group interviews and workshops.

3.2 Ethical considerations

The study was approved by the Institutional Review Board of a University. In our research, ChatGPT, served as a representative example of LLM-driven CAs, employing a multi-faceted approach that includes fine-tuning, human reviewer guidelines, and user feedback to mitigate the generation of potentially sensitive or harmful content [76]. Nevertheless, we recognize that this investigation may present ethical complexities. These include the potential for LLMs to produce harmful or biased responses [19, 28], as well as the limited extant research concerning the psychological and social

Number of Participants		14
Age	Mean, range	23, 18-37
Gender	Male	11
	Female	3
Education	High school graduate	3
	Undergraduate students	7
	Bachelor	4
Familiarity with LLM-based CAs	Often use it (more than three times a week)	4
	Occasionally use it (about once a week)	2
	Never used it (heard of it)	8

Table 1: Demographics of study participants. The data are presented in aggregate form to preserve the anonymity of individual participants.

implications of utilizing LLM-driven CAs within the autistic community. To address these ethical considerations, a psychiatrist on our team—serving as the fifth author—leveraged over two decades of experience with young autistic adults to assist in the establishment of the study’s procedural guidelines and risk response protocols. This protocol addresses three major issues: 1) targeted recruitment with a autism specialist, 2) tutorial on ethical issues, and 3) one-on-one guidance during ChatGPT use, which we will elaborate on below.

First, during the recruiting phase, we employed a **targeted approach to disseminate information about our study**. This was achieved through a **collaboration with an autism specialist**, serving as the fourth author, who holds a doctoral degree in autism education and possesses over a decade of experience in counseling autistic children. This expert extended invitation to participate in the study to individuals within her professional network who did not exhibit substantial emotional or psychological difficulties. Secondly, in both the focus group and the workshop settings, we provided participants with a **comprehensive tutorial concerning the ethical deployment of LLM-driven CAs**. This tutorial was informed by the recent research and guidelines on ethical usage of ChatGPT [105, 115]. The instructional material encompassed a range of pertinent topics including bias, privacy and security, abuse, authorship, hallucinations, undue trust in the technology, and self-referential (AI-based) monitoring mechanisms. To enhance participants’ comprehension of these complex issues, we provided real-world examples illustrating instances where these ethical concerns have manifested and led to adverse outcomes. Lastly, we orchestrated an environment wherein **participants could interact with ChatGPT while receiving individualized support from a member of the research team**. Our study protocol mandated the continual monitoring of dialogues between participants and ChatGPT, along with solicitation of participants’ emotional responses and cognitive reflections after each topic of conversation. A researcher should observe that a participant had an adverse experience directly relating to the ethical issues proposed in the tutorial [105, 115]. The protocol required that the researcher clarify the issue at hand for the participant. Throughout this process, our fourth author, an expert in autism, was actively involved in the identification of potential risk factors and the recommendation of tailored countermeasures based on the individual characteristics

of each participant. If it was ascertained that a participant was encountering significant and sustained negative effects, protocols were in place to terminate the study. However, full compensation was provided, along with an offer of subsequent support from the clinician co-author.

3.3 Procedure

3.3.1 Focus group interview. In the initial session of our study, we conducted interviews to capture participants’ prior experiences and perceptions of LLM-driven CAs. We created a group environment in which participants could exchange views with their peers and researchers, thus promoting their autonomy [90] and broadening their perspectives [8]. Of the 14 participants, seven were divided into three small groups, each consisting of 2-3 members. The remaining seven participants, long-standing members of a self-help group, were interviewed together, as they felt at ease sharing their thoughts in this setting. We implemented a worksheet method to allow the participants ample opportunities to organize and articulate their thoughts. Participants first wrote down their responses to the given questions and then shared and discussed them with others.

Given that LLM-driven CAs are rooted in AI, we first sought to understand the participants’ overall AI literacy. We began by asking participants about the everyday AI products they knew and expressing their understanding of AI through drawings or writing. We then provided an overview of basic concepts and primary capabilities of AI to ensure a shared understanding among participants. To avoid biasing how participants perceive AI, we structured our materials based on AI education guidelines for non-expert students, which are “five big ideas” for teaching AI proposed by Touretzky et al. [97] and AI literacy competencies for learners suggested by Long and Magerko [70]. Our explanation covered topics such as “how AI works”, “what AI can do”, “the positive and negative impacts of AI applications”, and “the importance of critical thinking”, all of which were presented with relevant examples. Based on our explanation, the participants reflected on their prior experiences with AI-embedded products and discussed their relevance to their daily lives. We then introduced the most popular service of LLM-driven CAs, ChatGPT, along with the basic concept of LLMs. We detailed the diverse applications of LLM-driven CAs with examples and highlighted ethical concerns such as hallucinations, data security,

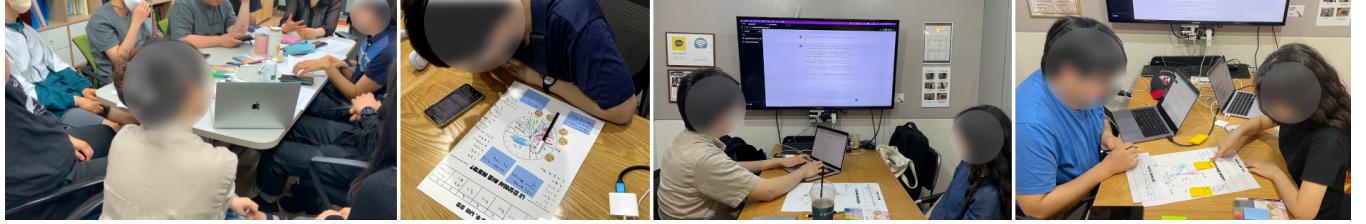


Figure 1: Focus group participants discussing their prior experiences with AI (far left), and workshop participants brainstorming how to use LLM-driven CAs in addressing their daily issues by interacting with ChatGPT.

and emotional detachment. This explanatory content was developed based on the “Quick start guide for ChatGPT and artificial intelligence in higher education” published by UNESCO [88]. The session concluded with discussions on their impressions of ChatGPT and its potential positive and negative impacts on their lives. The face-to-face group interview sessions lasted approximately 45 to 83 minutes. For reference, the focus group interview questionnaire can be found in the Appendix A.1.

3.3.2 Workshop. After the group interviews, we conducted a workshop to capture the participants’ expectations and challenges in integrating LLM-driven CAs into their daily lives. To prompt participants to envision the diverse application of CAs in various life aspects, we encouraged them to first reflect on their day-to-day needs and then consider the potential use of CAs to address these needs. The workshop was conducted individually with each participant to ensure that the researchers provided one-on-one support. This individualized approach not only enabled participants to share personal stories but also allowed researchers to closely follow their interactions with the CAs, probing their reasons and emotions [22].

We provided participants with a worksheet in the form of a daily planner to stimulate the use of LLM-driven CAs for various purposes in their lives (Figure 2). To recall their daily routines, we asked them to document their plans for the upcoming week in the weekly planning section. Based on this, participants were asked to choose a day they were eager or worried about and detail that day’s events in a circular daily planning section. Afterward, they noted any anticipated challenges or significant issues next to each planned activity for the day. Moreover, we showcased categories and examples of questions posted by autistic individuals in online communities [45] (e.g., grooming, health habits, work and study, social activity, interest, etc.) to draw out everyday concerns and interests unrelated to their documented schedule.

Subsequently, the participants explored how to leverage LLM-driven CAs to address the daily issues and challenges they raised. We first introduced various types of conversations with CAs through example prompts, including simple question-answer, simulations, small talk, and creative work. Next, we provided each participant with an individual ChatGPT account (using the GPT-4 model) and encouraged them to explore its features freely. After exploration, the participants brainstormed possible conversation topics with ChatGPT related to their previously mentioned daily issues and jotted them down on post-it notes. They then freely interacted with ChatGPT on the listed topics about 30 minutes and added,

removed, or adjusted topics as needed. Throughout the process, the researcher did not directly engage with the participants’ interactions and ideation with ChatGPT, to prevent our perspectives from leading their behaviors and thoughts. Instead, we served as moderators, assisting with technical issues related to ChatGPT and reminding them of unaddressed daily issues from their worksheets. We also stimulated participants’ thought by continuously questioning their motivations for discussing the given topics with ChatGPT and their impressions of the CA’s responses.

At the end of the session, we asked participants about their overall workshop experience. Our questions delved into what they had learned or realized regarding LLM-driven CAs through the workshop, any changes in their perspectives on integrating LLM-driven CAs into their daily lives, and any perceived challenges or potential risks associated with using this technology. The debriefing interview questionnaire can be found in Appendix A.2. The workshop lasted between 62 and 84 minutes.

3.4 Data Analysis

All interviews and workshops were audio-recorded and transcribed. The dataset for analysis included transcriptions, participants’ worksheets, post-its listing desired conversation topics with ChatGPT, and ChatGPT usage logs from the workshop. We first sorted the 99 desired conversation topics with ChatGPT and documented the post-its to understand their expectations of LLM-driven CAs. Using nine categories from a previous study that analyzed questions posted by autistic individuals in online communities [45], the first and second authors collaboratively categorized the participants’ conversation topics. Throughout this process, the two categories were merged, and four new categories emerged. The final categories were: 1) daily planning, 2) physical or mental health habits, 3) grooming, 4) household chores, 5) financial management, 6) work and study, 7) social relationships and communication, 8) romantic relationships, 9) interest and leisure, 10) emotional support, 11) self-inquiry, and 12) small talk (Table 2).

We analyzed the qualitative data using a thematic coding approach [13]. All raw data were digitized using ATLAS.ti [3], and the first author initiated the analysis with the open-coding process. The second and third authors then critically reviewed the codes created by the first author and corresponding raw data, which led them to develop their individual codebooks. Following this, all three authors jointly conducted a comprehensive review of these codebooks and provided detailed written feedback. The team then gathered to reconcile different views, resulting in a list of 109 initial codes. To

further validate our coding, we conducted two additional rounds of review and cross-checking. This process led to the addition of four new codes, bringing our total to 113. These codes were then categorized into broader themes using the affinity diagram method [44], with a primary focus on: 1) perceptions and attitudes toward AI and LLM-driven CAs, 2) interaction patterns with LLM-driven CAs and their reasons, and 3) potential challenges with CA interactions. Consequently, we structured our results into ten primary themes and 23 sub-themes.

4 FINDINGS

In the following section, we delineate our findings into three distinct themes: (1) our participants' perceptions of AI and how they relate to the use of LLM-driven CAs; (2) our participants' expectations of LLM-driven CAs in everyday contexts; and (3) the unforeseen challenges they encounter when interacting with LLMs.

4.1 What is AI? What role does it play in your daily life?

4.1.1 AI is said to be omnipotent. Of the 14 participants, eight (P2, P3, P7, P9, P10, P12, P13, and P14) were aware of AI, but felt it was distant from their daily lives. They could only associate AI with recommendation systems on YouTube or Netflix and had limited first-hand experience with such AI-embedded products. Most of these participants, without a technical background, learned about AI through media sources such as news outlets and YouTube. In particular, the recent outpouring of media content spotlighting the life-changing ChatGPT has led them to perceive it as an extraordinary entity capable of achieving anything. Participants viewed ChatGPT as "smarter than humans (P3)" and believed it could "address every issue in my life (P7)," showing strong optimism about using this technology.

I have been so hooked on the news these days, and what catches my eye every single time is ChatGPT. I have read tons of articles saying how groundbreaking and exciting it is. I even heard an episode where they were calling it a "world-changing technology." There have even been debates about whether using it is cheating or not. So, to get to use ChatGPT in this study? I am super pumped. (P9)

However, the elevated expectations surrounding LLM's capabilities served as a barrier for some participants (P3, P7, P10, and P12) in using ChatGPT. They expressed low confidence in learning and adopting ChatGPT, attributing this to their own lack of educational availability. This led to concerns like, "*Can someone like me, who knows nothing about this all-powerful AI, actually use it? (P10)*," thus lowering their confidence in accessing ChatGPT. P12 even reached out to us along with their parents the day before the workshop, asking, "*I have autism and developmental disability. Can I use ChatGPT?*"

4.1.2 I'm proficient with AI, but only in the area I first encountered. The other six participants (P1, P4, P5, P6, P8, and P11) who had been using ChatGPT self-identified themselves as skilled AI users and viewed AI as an integral part of their everyday lives. Most of them were either college graduates or undergraduate students, and

four of them were majoring in data science and AI; therefore, they understood in depth how AI works and what it can do. They spontaneously discussed privacy and overreliance concerns that they encountered in various AI applications, such as job interviews and smartphone facial recognition. In addition, some participants established criteria for responsibly harnessing ChatGPT after reflecting on their usage.

I have been hesitant to fully adopt ChatGPT because if everyone uses AI, the outcomes will all become homogenized. (P8)

My writing needed more than a little help, so I tried having ChatGPT edit it for me. The edited version definitely felt well-written and excellent. But I couldn't bring myself to submit that version. I figured I should just use it as a reference, especially given the ongoing discussions about copyright issues and misinformation. (P6)

While the participants were already using ChatGPT with high levels of AI literacy, their use was mostly limited to specific areas. Their experiences with the technology during the initial phase heavily influenced how they interacted with the technology, as well as their attitude toward ChatGPT. Most participants in this group were introduced to ChatGPT through university classes and reported using CAs primarily for academic purposes. During the workshop, in which participants were encouraged to ideate using ChatGPT in diverse aspects of their lives, they were surprised that they had not considered using the technology outside academic contexts. This shows that our autistic participants had few opportunities to proactively explore ways to integrate ChatGPT into their lives.

[After sharing personal concerns with ChatGPT] I never imagined I could have such a meaningful conversation with ChatGPT. I mean, I knew it was possible, but why didn't it cross my mind? I guess I was too focused on using it for school, especially since my professor hyped it up as a great study tool. (P4)

4.2 What do you expect from LLM-driven CAs?

We uncovered what autistic participants broadly expected from ChatGPT in their daily lives by further exploring the topics they ideated by interacting with ChatGPT in workshops, as shown in Table 2.

4.2.1 Go-to source for daily information. All participants were adults either living independently or aspiring to achieve financial and social independence from their parents. Therefore, one of their primary concerns was how to manage day-to-day challenges without the assistance of their family members. The immediate, on-demand nature of ChatGPT contributed to the participants' confidence in handling daily issues. It is noteworthy that the participants noted a lack of online communities in Korea where autistic individuals can find information tailored to their particular situation. They welcomed ChatGPT as a newfound channel for discussing issues that they wanted to keep private to those around them.

So I used to go on Jisik-in (a Q&A service (e.g., Quora) by the Korean portal company, Naver) a lot. Many of my autistic friends use it too. But the problem is that

Mon	Tue	Wed	Thur	Fri	Sat	Sun
			Watching baseball	Join a rally		

How can I use ChatGPT in my daily life?

Travel

Read books

Study English

Weight loss

+ Skill development,
portfolio building

Careful about meeting people
(group project)

Poor concentration
(close unnecessary browser tabs)

Puppy health care

Invest/
Financial management

congratulatory money

How to approach
and talk to
women

ChatGPT - Set
my boundaries.
How to limit
studying hours

Struggle with
overeating

Conflict
with parents
(nagging)

Career-related
anxiety

Academic pressure

College: Stress with
relationships and
commuting

Reading books

+Personal
Development

+Leisure

How to engage in
conversations
based on the
situation and topic.

Bedtime

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12

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Workout

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(A) Translated worksheet of P1

Weekly schedule for next week

Mon	Tue	Wed	Thur	Fri	Sat	Sun
Go to church	Job search meeting	Otolaryngology		Last day at work		

How can I use ChatGPT in my daily life?

Why won't the war in Ukraine ever end!

- It's getting in the way of my romantic relationship!!

Will I get a vacation? Proper

Become independent from family

My family and I are opposites

I absolutely must find a better company

Want a salary raise, enough so my bank account isn't empty

I'm already short on ideas, why are they pushing for more VR implementations!

Report tragic news with composure

Resolve conflicts with my sister

VR content creation (narrative, scene, script)

Prepare a VR scenario

Job evaluation criteria
Appropriate salary
Financial management
Leave my job on good terms

(B) Translated worksheet of P9

Figure 2: Translated versions of participant worksheets. Participants wrote their daily routine in the circular daily planner section and identified anticipated challenges and issues. They then explored approaches for addressing these issues with LLM-driven CAs and wrote down these on post-it notes. We marked issues related to the daily routines written by participants in the circular planner in black, and issues related to their broader life in blue. The original worksheet is attached in the Appendix B.

it is hard to find questions asked by autistic people there. I am usually left with questions and answers that wouldn't really apply to my situation. And when I urgently post a question, I rarely get an immediate reply. It is pretty much useless. (P7)

As for me, there are things I don't want to discuss with my parents anymore... like dating or sexual questions. Then I have no one else to ask. When you guys [the researchers] are gone, I would like to ask ChatGPT about that stuff. (P10)

Workshop participants inquired about a range of life skills from ChatGPT. Their questions spanned topics such as dealing with cockroaches that suddenly appeared, curbing excessive spending on gaming, matching clothing colors, using a nagging bot to beat laziness, and strategies to quit smoking. Overall, the participants rated the CAs' responses as highly useful. Participants specifically appreciated the directness of the CA's answers, which "*only responded to exactly what I asked (P9)*." Several of our autistic participants commented that sorting through huge amounts of information on the internet to determine what is relevant is challenging. By

Conversation Categories	Topics
Daily planning	Improving focus while working (P1, P3); Laziness—a bot that tells you to snap out of it (P4); Breaking addictive habits (P10)
Health (physical/mental)	Quitting smoking (P12); Relieving work-related headaches (P12); Dealing with leg cramps (P12); Coping with food coma (P12)
Grooming	Choosing clothing colors (P5); Exercising/Bodybuilding (P7)
Household chores	Getting recipe suggestions based on the fridge ingredients (P4), Cockroach extermination (P5)
Financial management	Avoiding wasting money (P2, P3); Appropriate salary levels (P9); Role models for financial management (P10); Quick ways to save up seed money (P12); Spending too much on Yu-Gi-Oh game (P13)
Work or study	Recommending new summer menu for parents' restaurant (P3); Crafting engaging stories for customers on social media (P5); Asking for test questions (P7, P8); Getting feedback on essay (P7); Brainstorming business ideas (P8); Asking about how to use video editing program (P8); Job evaluation criteria (P9); Work-writing VR scenarios (P9); Morning inspiration quotes for study (P11); Learning calculus formula (P12); Memorizing exponential laws (P14)
Social relationships and communication	Joining conversations (P1); Approaching friends (P3, P6); Comforting words when parents argue (P3); Asking if what I said to a friend was appropriate (P4); Dealing with unruly customers when working at a cafe (P5); Leading conversations in self-help groups (P5); Relationship with friends (P7, P12); Inquiring about the intent behind messages (P7, P10, P12); Simulating conversations with someone you want to get closer to (P8); Graceful exit from a company (P9); Writing a resignation letter (P9); Resolving conflicts with a sister (P9); Reporting tragic news with composure (P9); Reaching out to an old contact (P10); Resolving misunderstandings in communication (P10); Managing facial expressions (P10); Family gift ideas (P11); Dealing with a father's snoring (P13); Relationships with family (P13); Avoiding/Dealing with conflicts with friends (P14)
Romantic relationship	Practicing interactions with women (P1); Simulating blind date (P7); Initiating conversations with the potential dates (P10); How to be in a romantic relationship (P12); Dealing with communication issues with a boyfriend (P14)
Interest and leisure	Creating baseball cheers (P6); Recommending Just Dance songs (P6); Debating with AI (P7); Discussing politics (P8); Writing poetry (P8); Writing political opinion columns (P11); Creating game modes (P11); Generating ideas for games/movies/novels (P11); Rewriting song lyrics (P11); Analyzing game/movie reviews (P11); Imagining future scenarios (P11); Getting recommendation of travel destination (P12)
Emotional support	Boosting self-esteem (P3); Compliment Bot for self-esteem (P4, P10); Confiding personal emotions (P10); Counseling Bot (P10); Morning word of encouragement (P11); Avoiding unnecessary comparisons and inferiority complex with others (P13)
Self-inquiry	Asking about personality (P3); Seeking suitable jobs (P9, P10); Inquiring about the characteristics of autism distinct from developmental disabilities (P12); Contemplating living independently from parents (P9)
Small talk	Talking like friends (P14); Word Chain Game (P10, P14)

Table 2: Conversational topics generated by participants with LLM-driven CAs during the workshop. Participants engaged in conversations with ChatGPT on all listed topics throughout the workshop.

contrast, ChatGPT provided contextualized information in an easy-to-understand format, enabling participants to effectively absorb the information they sought.

4.2.2 In search of social clues. As reported in prior research [4], autistic participants expressed that understanding and navigating implicit social rules remains a challenge. Furthermore, they noted that few resources were available for seeking social advice after reaching adulthood. This aspiration was further confirmed by the fact that participants often brainstormed topics related to social activities for ChatGPT. All participants except P2 and P11 inputted prompts related to their social relationships with family, friends, colleagues, and romantic partners. Conversation on this topic among participants largely took two approaches: 1) seeking coping strategies and 2) interpreting others' intentions.

I had to do a group project in college, and the professor said we had to form our own groups. But I could not figure out how to approach people to form a group, so I ended up doing the entire project by myself, for the entire semester. If I had ChatGPT back then, I would have asked how to approach people to form a group. (P1)

I uploaded a selfie with my friend on Instagram today. And my friend's face got cut off in the picture so I said that it seemed like they had been hit by a bomb. After

that, I kept wondering if I made a mistake, but I could not ask my friend about it. I have never really resolved these kinds of concerns. I just let them go. I'm not even sure if I'm doing things right... (P4)

The most commonly engaged social conversations with ChatGPT involved exploring strategies to cope with unfamiliar and stressful social contexts, such as “what to do when customers get out of hand (P5),” “how to comfort parents after they’ve had an argument (P3),” and “how to report tragic news with composure (P9).” They also consulted ChatGPT to determine whether their behavior was appropriate in particular scenarios, such as interacting with friends or controlling their facial expressions on the job. Some participants were interested but worried about romantic relationships, and simulated blind date scenarios with ChatGPT as a form of practice.

Some participants went beyond reflecting on their own social behaviors and employed chatGPT to interpret the emotions and thoughts of others. For example, P7, P10, and P12 copied and pasted text messages that they had received from their friends and asked ChatGPT what their intentions might be. P5, who had just launched an online store, provided ChatGPT with information about their target customers and asked how potential customers might perceive their marketing text:

🗣 P5: Basic Information: 30s-40s, Female, Raising children, Employed
 Values: Children should be raised in a clean environment!
 Goal: Needs a clean space + wants to create a clean space without spending too much time.
 Taste and Personality: It is the bathroom my kids are using after all...
 Emotion: I need to start taking care of my health...

I plan to sell bathroom wipers online to the people mentioned above. How would this person feel about the promotional content I wrote below? What features should I emphasize to increase the likelihood of her making a purchase? (P5's prompt)

4.2.3 Common ground, unlimited conversation. Many participants were deeply interested in discussing specific topics, but they often found it difficult to satisfy this need in everyday conversations. There were a few people around them with shared interests, and they experienced people avoiding conversations when delving into their favorite topics. In this context, the participants wanted ChatGPT to become an unwary conversation partner, allowing for unlimited discussions on any topic they desired. In our workshop, some participants with specific interests (P1, P6, P7, P8, and P11) engaged in ChatGPT by debating social and political issues, co-writing song lyrics and poetry, and brainstorming game plots. In addition, P12, who dropped out of college due to bullying, had unfulfilled academic curiosity, particularly in mathematics and science. He quizzed ChatGPT about scientific knowledge and viewed CAs as outlets for satisfying his intellectual needs. These participants valued LLM-driven CAs as allowing them to fully express their interests without social pressure and to conform to the standards or norms of others.

Talking with people, you can't just talk about what interests you. They would get bored of me. But this thing (ChatGPT) answers sincerely no matter how many questions I ask, and I really like that. (P11)

4.2.4 Questioning the Inner Self. Some participants (P3, P9, P10, and P12) shared questions about themselves with ChatGPT. When reflecting on their own characteristics and forming a self-concept, they referred to ChatGPT answers as second opinions. Participants often noted that their perceptions of themselves differed from those of others judged them. To gain self-understanding without being swayed by others' opinions, they hoped that ChatGPT, trained on extensive data, would provide more objective perspectives. P6 asked ChatGPT whether he is an introverted person by elaborating on past events with friends. P12 wanted to explore "autism" in depth and how it differed from other developmental disabilities. Meanwhile, some participants (P9, P10) expressed concerns about their career potential:

🗣 P9: I am currently working in a creative role, but my boss told me that someone like me, who has autism, is better suited to

traditional roles. It feels as if he is suggesting that I should quit. Am I not a good fit for this job? [...] Also, I want to know what kinds of stress can autistic workers experience in their workplace and what are some good ways to address it?

🤖 ChatGPT: It is important to remember that Autism Spectrum Disorder (ASD) encompasses a wide range of characteristics and abilities, and it is incorrect to generalize that someone with autism is not suitable for creative tasks. [...] Possible Stressors for Workers with Autism: social interactions: [...], environmental factors: [...], sudden changes in tasks: [...], ambiguous instructions: [...].

As a result of a conversation with ChatGPT, P9 not only reassessed his work experience but also realized that communicating with his boss was a major stressor. This led him to request for improvements.

Sudden changes in tasks without notice... vague instructions... Yes, that is it! That's been the issue all along. I really need to show this to my boss! (P9)

4.2.5 Finding comfort in chat. We observed that many participants (P3, P4, P10, P11, and P13) sought emotional support from ChatGPT. Participants emphasized that, unlike their interactions with people, they felt that ChatGPT appeared to make an effort to understand them without harboring biased views. This allowed them to freely express their innermost thoughts and emotions. For example, P13 discussed his concerns about feeling inferior to ChatGPT:

🗣 P13: I saw some friends using more fancier trading card game gear than I had, and it made my stuff look like trash. I felt worthless and lagged behind. Then, I hear a voice in my head saying, "Hey, don't you wanna beat them? Don't you want to be the perfect gamer?" It feels like I am threatened by myself. I want some comfort.

🤖 ChatGPT: I know that it is very tough and disheartening when you compare yourself to those around you, especially when they seem to shine so brightly. However, remember that your worth is not determined by the material things you have or do not have. [...] And always remember, you are on your own unique journey. You are already enough, as you are, and you are constantly growing.

After receiving ChatGPT's response, P13 paused for quite some time and shed tears, saying, "*This is the first time I've received comfort instead of advice to correct myself.*" Other participants (P4 and P10) mentioned that conversations with ChatGPT could potentially serve as an alternative to counseling in the future, pointing out that professional counseling was helpful but financially burdened.

[After writing a prompt that asks “praise me unconditionally”] It (ChatGPT) sounds just like the counselor who comes to the mindfulness sessions I attend. She is great, but I cannot see her all the time, and individual sessions are too expensive. I think it could really help with my self-esteem, like writing a journal before bed. (P10)

4.3 What challenges do you face with LLM-driven CAs?

4.3.1 Excessive reliance on ChatGPT. The logical and persuasive responses of ChatGPT impressed the participants, resulting in a high level of trust. They even felt that ChatGPT was smarter than humans, noting its flawless grammar and spelling. This occasionally prompted participants to regard ChatGPT’s responses as an “answer sheet” to which to conform. In particular, they used the ChatGPT recommendations as a benchmark to compare and evaluate their own behavior.

[After asking the question, “Recommend me how to deal with my parents’ nagging without getting angry?”] Oh, that is what I was doing. When my parents were nagging me, I would purposely leave home and go somewhere else just to cool off. I was doing something right! (P1)

I’ve only tried the first recommendation from the AI to improve my reading comprehension, regular reading. I didn’t try any of the others, like making flashcards or joining a reading club. Maybe that’s why my comprehension stayed poor... (P7)

Whenever this occurred, we informed the participants that ChatGPT’s responses may not be absolute and should be used as a reference for their own decision-making. While participants were cautious in accepting the information related to work and study, they reported an unintended reliance on the CA, particularly when discussing “areas of insecurity (P14)” like social interaction. To avoid blind faith in ChatGPT, some participants came up with the idea of gathering multiple CA answers representing diverse perspectives to crosscheck their consistency.

I’m not confident about how well I’m doing in my school life. But this thing [the CA] is really eloquent. So, until you (the researcher) told me, I just believed it without any doubt. There are a lot of variables, and it’s hard to make judgments, so I think I need to get multiple answers repeatedly. It’s like asking it to “Talk like my friends, talk like my mom.” (P8)

4.3.2 Disclosing autistic characteristics to ChatGPT. Autistic participants, who perceived themselves as having a unique approach to thinking and communicating, desired to obtain CA responses that meet their specific needs. Therefore, some participants (P12 and P14) detailed their physical and social backgrounds, particularly their autism-related characteristics, during their prompts.

P12: I have autism and work a contracted job for 8 hours a day. I have been here for seven months and cannot transition to a full-time position. However, if I continue to give my best, always greet people cheerfully,

and respond respectfully to my team, can I land a better job in the future? For reference, I understood Carnegie’s principles of human relations in 3.5 hours. I can use public transportation alone, but I cannot go overseas because of difficulties in English communication. However, I am good at writing and summarizing. (P12’s prompt)

P14: My dream is to master middle school math, especially the laws of exponents. So I have recently been learning math from friends I met on Discord. But I have autism, and I find it difficult to focus while studying. Can you explain the laws of the exponents in a way that is easy for me to understand? (P14’s prompt)

When participants included information about their autistic features along with their questions, the ChatGPT offered responses like “**P14:** Not all autistic individuals are the same, so different approaches and support may be needed depending on individual needs and abilities.” Participants noted that by disclosing their autism, they not only avoided generalized answers but also felt that their identities were respected.

However, the majority of participants stated that they would never disclose their autism traits or disability status to the ChatGPT. These participants had faced discrimination in schools or workplaces for disclosing their autism, leading them to be fearful of even revealing their autistic identity to AI. P3 said, “I worry that ChatGPT could subtly ignore me if I bring up autism. Like it might provide good information to others but not talk to me at all.” Participants who were well-versed in how AI works raised concerns about the potential harm arising from data leaks.

Suppose my data gets leaked. It could spread and then all the machines around the world might know I have autism, right? Then when I use other technologies that have AI, they might already know I have a disability and exclude me accordingly. (P4)

5 DISCUSSIONS

In our study, we found that autistic individuals expected to use LLM-driven CAs for social advice and care for their cognitive health. However, the excessive reliance of users on the responses provided by CAs and the tension between personalization and privacy protection in the context of LLM-driven CAs have been identified as concerns. Building upon these findings, we propose an approach to encourage autistic users to proactively integrate LLM-driven CAs into their daily lives while preserving their unique attributes.

5.1 Taking initiative to appropriate LLM-driven CAs

Historically, the majority of research studies on autistic individuals have focused on changing their behaviors and traits to conform to societal norms that typically apply to non-autistic individuals [50, 81]. A significant shift occurred when an autistic sociologist introduced the term “neurodiversity,” initiating a movement

to view autism as an inherent characteristic rather than a condition [53, 57]. Essentially, the neurodiversity paradigm seeks to empower autistic individuals with more control over their lives by enhancing their autonomy and self-determination [65]. In light of this shift, recent studies on HCI and accessibility have focused on fostering self-advocacy and self-empowerment among autistic users through technology, as opposed to merely accommodating technology [60, 85, 86, 93, 104].

Our research findings confirm that interaction with LLM-driven CAs can put autistic users at the forefront of addressing their day-to-day needs. By reducing the dependence of participants on traditional online and offline support networks, CAs improved their confidence in managing everyday concerns. Participants also creatively appropriated CAs to meet various everyday needs, such as rehearsing dating scenarios, creating a conversation partner that is knowledgeable in a certain domain, and building self-esteem-boosting compliment bots. In some cases, the responses from LLM-driven CAs even motivated autistic individuals to take steps to improve their problem-solving skills in the workplace and advocate for their rights.

Our workshop encouraged autistic individuals to develop scaffolds for integrating LLM-based CAs into their daily routines. Before participating in our study, those who first encountered LLM-driven CAs for academic purposes found it challenging to envision their potential applications in various aspects of life. Moreover, a lack of knowledge on AI and emotional barriers to LLM-driven CAs inhibited some participants from employing them. However, through the workshop, participants themselves identified 99 diverse potential applications for LLM-driven CAs. They engaged in activities such as 1) identifying challenges they often face, 2) examining whether LLM-driven CAs could effectively address these challenges based on their personal needs, and 3) developing strategies to align technology use with their goals and values. Thus, autistic individuals were more than passive users learning how the technology works; they played an active role in shaping the use of technology to suit their specific needs. This approach resonates with the argument by Spiel et al. that autistic people should experience technology in an agentive manner, respecting their unique identity and characteristics [94]. Therefore, we call for the necessity of an on-boarding process that gives autistic people the opportunity to recognize their own needs instead of focusing only on their technical abilities. The LLM-driven CA platform could provide moments where users can express their values, explore the capabilities of the technology, and define its role in a self-guided manner. In addition to efforts at system level, casual discussions in domestic settings [71] or within the autistic community could provide opportunities for autistic individuals to establish and reflect their own criteria for the proactive use of LLM-driven CAs.

5.2 Toward an inclusive LLM-driven CA experience for neurodiverse population

Companies such as OpenAI, responsible for developing LLM models, have made significant strides in advancing conversational AI through accessible platforms, enriching the lives of countless individuals. Nevertheless, given the ongoing concerns about the underrepresentation of minority groups in AI training datasets [56,

62, 73, 73, 100, 101], it is likely that LLM-driven CAs primarily reflect the perspectives of neurotypical users, who constitute the majority in our society. Our findings reveal that the responses from these LLM-driven CAs can have a significant impact on the lives of autistic individuals, from day-to-day decision-making to self-perception. Notably, autistic individuals tended to compare their own behavior with the responses provided by CAs, often adjusting their actions according to the suggestions provided by the CAs. This raises concerns that interactions with LLM-driven CAs could potentially enforce normative behaviors defined by neurotypical society on autistic users, potentially causing them to compromise their own needs [20]. In this context, creating an inclusive LLM-driven CA environment where neurodiverse users can preserve their unique characteristics and values should be considered.

Furthermore, it is crucial for users to provide textual prompts that reflect their desires in LLM-driven CA conversations to receive outputs tailored to their individual needs [113]. The participants in our study mentioned that they received more personalized responses when they clarified their goals, situations, and needs. Particularly, when participants disclosed their autistic features to CAs, the CA responses considered their physical and cognitive attributes, and also emphasized the individuality within the autistic spectrum, stating that “*👤: not all autistic individuals are the same, so different approaches and support may be needed depending on individual needs and abilities.*” However, some autistic users might not fully realize the benefits of disclosing their specific requirements, or may be reluctant to do so owing to past experiences of discrimination, as observed among some of our participants. Therefore, the system can offer an accessible environment that encourages users to articulate their specific needs in a conversational manner. This could involve providing follow-up questions to gather additional information needed for tailored results.

Additionally, facilitating autistic individuals to critically evaluate whether responses from LLM-based CAs align with their own standards and values could serve as another pillar for promoting an inclusive experience. In recent years, significant efforts have been made to foster critical thinking skills in individuals to become responsible AI users, including UNESCO’s ChatGPT usage guidelines [88] educational curricula [31, 61, 98] and informal experiences through exhibitions [67–69]. While some studies aimed to cultivate critical thinking in AI usage among underrepresented groups (e.g., children from lower socioeconomic backgrounds [29] and black girls [91]), there is a noticeable gap in initiatives aimed at empowering neurodiverse populations to become critical AI users. There is an opportunity to develop education and infrastructure support that enables individuals to establish their own guidelines for the ethical use of LLM-driven CAs, similar to existing initiatives within the autistic community that offer guidelines [112] to enhance digital literacy (e.g., social media usage, email writing).

6 LIMITATIONS AND FUTURE WORK

There are multiple limitations to consider in our study. First, since all participants were from Korea, the cultural context specific to Korean individuals with autism may have influenced our results. Although our sample size aligns with other qualitative studies on technology use in autism [77, 110], its relatively limited size could

constrain the generalizability of our results. Second, our research only allowed participants to interact with LLM-driven CAs in a controlled setting guided by researchers, aiming to create a safe setting for engagement. However, the workshop's brainstorm-focused nature restricted our examination of on-demand use of the technology in daily scenarios, such as how autistic individuals accept CA's responses in real-life settings, the impacts this technology might have on their lives, and any additional desires or unexpected risks. We recommend that future studies employ empirical approaches, including diary studies, longitudinal studies, and ethnographic observations, to gain a more comprehensive and contextualized understanding of autistic users' real-life experiences. Furthermore, the results of our study, rooted in direct engagement with autistic users to understand their needs, can also serve as a starting point for comprehending their technology use in empirical settings based on their unique perspectives. Particularly, the challenges identified in our study shed light on critical areas that require more attention in real-world applications. This understanding is essential for researchers to ensure ethical and safe interactions for participants in future studies. Last, our study focused only on a specific subset of the autistic population that is literate. While the insights gained offer a holistic understanding of the technology experiences of users with autistic features, we might miss capturing opportunities for broader inclusivity, particularly among non-verbal autistic individuals. Prior research has shown the potential for non-verbal autistic children to communicate via chatbots through augmentative and alternative communication (AAC) tools [24]. Therefore, future studies need to explore the possibilities of using multimodal approaches with LLM-driven CAs as a new communication channel for this group.

7 CONCLUSION

This study explored the opportunities and challenges of integrating LLM-driven CAs into the lives of autistic individuals through focus group interviews and workshops. We observed that autistic participants aspire to use LLM-driven CAs in proactive and creative ways to address a wide range of issues in their daily lives. However, autistic individuals often inadvertently adopt the responses from CAs and attempt to adjust their behavior accordingly. We conclude with recommendations aimed at empowering autistic users to take an agentive and critical stance in defining the meaning and role of this technology in their lives. We hope that these findings and recommendations pave the way for LLM-driven CAs to serve as new mediums through which autistic individuals can better communicate with the world, express their voices, and actively engage as social participants.

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REFERENCES

- [1] Ambitious about Autism. accessed 2023. *Ambitious Youth Network*. Retrieved September 09, 2023 from <https://ambitious-youth-network.ambitiousaboutautism.org.uk/>
- [2] AspieSingles. accessed 2023. *AspieSingles*. Retrieved September 09, 2022 from <https://www.aspie-singles.com/>
- [3] atlas.ti. accessed 2023. *atlas.ti*. Retrieved September 09, 2022 from <https:////atlasti.com>
- [4] Anthony Attwood. 2006. *The complete guide to Asperger's syndrome*. Jessica Kingsley Publishers.
- [5] Sanghwan Bae, Donghyun Kwak, Sungdong Kim, Donghoon Ham, Soyoung Kang, Sang-Woo Lee, and Woomyoung Park. 2022. Building a role specified open-domain dialogue system leveraging large-scale language models. *arXiv preprint arXiv:2205.00176* (2022).
- [6] Simon Baron-Cohen, Rebecca C. Knickmeyer, and Matthew K. Belmonte. 2005. Sex Differences in the Brain: Implications for Explaining Autism. *Science* 310, 5749 (2005), 819–823. <https://doi.org/10.1126/science.1115455> arXiv:<https://www.science.org/doi/pdf/10.1126/science.1115455>
- [7] Emily M. Bender, Timnit Gebru, Angelina McMillan-Major, and Shmargaret Shmitchell. 2021. On the Dangers of Stochastic Parrots: Can Language Models Be Too Big? In *Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency* (Virtual Event, Canada) (FAccT '21). Association for Computing Machinery, New York, NY, USA, 610–623. <https://doi.org/10.1145/3442188.3445922>
- [8] Laura Benton, Hilary Johnson, Emma Ashwin, Mark Brosnan, and Beate Grawemeyer. 2012. Developing IDEAS: Supporting Children with Autism within a Participatory Design Team. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (Austin, Texas, USA) (CHI '12). Association for Computing Machinery, New York, NY, USA, 2599–2608. <https://doi.org/10.1145/2207676.2208650>
- [9] Reuben Binns, Max Van Kleek, Michael Veale, Ulrik Lyngs, Jun Zhao, and Nigel Shadbolt. 2018. 'It's Reducing a Human Being to a Percentage': Perceptions of Justice in Algorithmic Decisions. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (Montreal QC, Canada) (CHI '18). Association for Computing Machinery, New York, NY, USA, 1–14. <https://doi.org/10.1145/3173574.3173951>
- [10] Shikha Bordia and Samuel R. Bowman. 2019. Identifying and Reducing Gender Bias in Word-Level Language Models. In *Proceedings of the 2019 Conference of the North American Chapter of the Association for Computational Linguistics: Student Research Workshop*. Association for Computational Linguistics, Minneapolis, Minnesota, 7–15. <https://doi.org/10.18653/v1/N19-3002>
- [11] Kristen Bottema-Beutel, Steven Kapp, Jessica Nina Lester, Noah J Sasson, and Brittany N Hand. 2021. Avoiding ableist language: Suggestions for autism researchers. *Autism in adulthood* 3, 1 (2021), 18–29.
- [12] Brian A. Boyd. 2002. Examining the Relationship BetWeen Stress and Lack of Social Support in Mothers of Children With Autism. *Focus on Autism and Other Developmental Disabilities* 17, 4 (2002), 208–215. <https://doi.org/10.1177/10883576020170040301> arXiv:<https://doi.org/10.1177/10883576020170040301>
- [13] Virginia Braun and Victoria Clarke. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology* 3, 2 (2006), 77–101. <https://doi.org/10.1191/1478088706qp063oa> arXiv:<https://www.tandfonline.com/doi/pdf/10.1191/1478088706qp063oa>
- [14] Tom Brown, Benjamin Mann, Nick Ryder, Melanie Subbiah, Jared D Kaplan, Prafulla Dhariwal, Arvind Neelakantan, Pranav Shyam, Girish Sastry, Amanda Askell, Sandhini Agarwal, Ariel Herbert-Voss, Gretchen Krueger, Tom Henighan, Rewon Child, Aditya Ramesh, Daniel Ziegler, Jeffrey Wu, Clemens Winter, Chris Hesse, Mark Chen, Eric Sigler, Mateusz Litwin, Scott Gray, Benjamin Chess, Jack Clark, Christopher Berner, Sam McCandlish, Alec Radford, Ilya Sutskever, and Dario Amodei. 2020. Language Models are Few-Shot Learners. In *Advances in Neural Information Processing Systems*, H. Larochelle, M. Ranzato, R. Hadsell, M.F. Balcan, and H. Lin (Eds.), Vol. 33. Curran Associates, Inc., 1877–1901. https://proceedings.neurips.cc/paper_files/paper/2020/file/1457c0d6fbcb4967418bf8ac142f64a-Paper.pdf
- [15] Moira Burke, Robert Kraut, and Diane Williams. 2010. Social Use of Computer-Mediated Communication by Adults on the Autism Spectrum. In *Proceedings of the 2010 ACM Conference on Computer Supported Cooperative Work* (Savannah, Georgia, USA) (CSCW '10). Association for Computing Machinery, New York, NY, USA, 425–434. <https://doi.org/10.1145/1718918.1718991>
- [16] Christi R. Carnahan, Kara Hume, Laura Clarke, and Christy Borders. 2009. Using Structured Work Systems to Promote Independence and Engagement for Students with Autism Spectrum Disorders. *TEACHING Exceptional Children* 41, 4 (2009), 6–14. <https://doi.org/10.1177/004005990904100401> arXiv:<https://doi.org/10.1177/004005990904100401>
- [17] Inha Cha, Sung-In Kim, Hwajung Hong, Heejeong Yoo, and Youn-kyung Lim. 2021. Exploring the Use of a Voice-Based Conversational Agent to Empower Adolescents with Autism Spectrum Disorder. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems* (Yokohama, Japan) (CHI '21). Association for Computing Machinery, New York, NY, USA, 1–14. <https://doi.org/10.1145/3411764.3445932>

- [21] Association for Computing Machinery, New York, NY, USA, Article 42, 15 pages. <https://doi.org/10.1145/3411764.3445116>
- [18] Gary KY Chan. 2022. AI employment decision-making: integrating the equal opportunity merit principle and explainable AI. *AI & SOCIETY* (2022), 1–12.
- [19] Ke-Li Chiu, Annie Collins, and Rohan Alexander. 2021. Detecting hate speech with gpt-3. *arXiv preprint arXiv:2103.12407* (2021).
- [20] Dason Choi, Sung-Ji Kim, Sunok Lee, Hyunseung Lim, Hee Jeong Yoo, and Hwajung Hong. 2023. Love on the Spectrum: Toward Inclusive Online Dating Experience of Autistic Individuals. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (Hamburg, Germany) (CHI '23). Association for Computing Machinery, New York, NY, USA, Article 53, 15 pages. <https://doi.org/10.1145/3544548.3581341>
- [21] Paul F Christiano, Jan Leike, Tom Brown, Miljan Martic, Shane Legg, and Dario Amodei. 2017. Deep Reinforcement Learning from Human Preferences. In *Advances in Neural Information Processing Systems*, I. Guyon, U. Von Luxburg, S. Bengio, H. Wallach, R. Fergus, S. Vishwanathan, and R. Garnett (Eds.), Vol. 30. Curran Associates, Inc. https://proceedings.neurips.cc/paper_files/paper/2017/file/d5e2c0adad503c91f91df240d0cd4e49-Paper.pdf
- [22] Katta Spiel Christopher Frauenberger and Julia Makhaeva. 2019. Thinking OutsideTheBox - Designing Smart Things with Autistic Children. *International Journal of Human-Computer Interaction* 35, 8 (2019), 666–678. <https://doi.org/10.1080/10447318.2018.1550177> arXiv:<https://doi.org/10.1080/10447318.2018.1550177> PMID: 31057337.
- [23] Lynn Clemens. accessed 2023. *Is ChatGPT autistic? A Diagnostic Interview with an AI*. Retrieved September 09, 2023 from <https://www.mediamic.net/en/page/387002/is-chatgpt-autistic>
- [24] Anabelle Cooper and David Ireland. 2018. Designing a chat-bot for non-verbal children on the autism spectrum. *Stud Health Technol Inform* 252 (2018), 63–68.
- [25] Debby R. E. Cotton, Peter A. Cotton, and J. Reuben Shipway. 2023. Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. *Innovations in Education and Teaching International* 0, 0 (2023), 1–12. <https://doi.org/10.1080/14703297.2023.2190148>
- [26] Kerstin Denecke, Alaa Abd-Alrazaq, and Mowafa Housey. 2021. *Artificial Intelligence for Chatbots in Mental Health: Opportunities and Challenges*. Springer International Publishing, Cham, 115–128. https://doi.org/10.1007/978-3-030-67303-1_10
- [27] Nathan Dennler, Anaelia Ovalle, Ashwin Singh, Luca Soldaini, Arjun Subramonian, Huy Tu, William Agnew, Avijit Ghosh, Kyra Yee, Irene Font Peradejordi, Zeerak Talat, Mayra Russo, and Jess De Jesus De Pinho Pinhal. 2023. Bound by the Bounty: Collaboratively Shaping Evaluation Processes for Queer AI Harms. In *Proceedings of the 2023 AAAI/ACM Conference on AI, Ethics, and Society* (Montréal, QC, Canada) (AIES '23). Association for Computing Machinery, New York, NY, USA, 375–386. <https://doi.org/10.1145/3600211.3604682>
- [28] Jwala Dhamala, Tony Sun, Varun Kumar, Satyapriya Krishna, Yada Prakashatkun, Kai-Wei Chang, and Rahul Gupta. 2021. BOLD: Dataset and Metrics for Measuring Biases in Open-Ended Language Generation. In *Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency* (Virtual Event, Canada) (FAccT '21). Association for Computing Machinery, New York, NY, USA, 862–872. <https://doi.org/10.1145/3442188.3445924>
- [29] Stefania Druga, Sarah T. Vu, Eesh Likhith, and Tammy Qiu. 2019. Inclusive AI Literacy for Kids around the World. In *Proceedings of FabLearn 2019* (New York, NY, USA) (FL2019). Association for Computing Machinery, New York, NY, USA, 104–111. <https://doi.org/10.1145/3311890.3311904>
- [30] Yogesh K. Dwivedi, Nir Kshetri, Laurie Hughes, Emma Louise Slade, Anand Jeyaraj, Arpan Kumar Kar, Abdullah M. Baabdullah, Alex Koohang, Vishnupriya Raghavan, Manju Ahuja, Hanaa Albanna, Mousa Ahmad Albasrahi, Adil S. Al-Busaidi, Janarthanan Balakrishnan, Yves Barlette, Sriparna Basu, Indranil Bose, Laurence Brooks, Dimitrios Buhalis, Lemuria Carter, Soumyadeb Chowdhury, Tom Crick, Scott W. Cunningham, Gareth H. Davies, Robert M. Davison, Rahul Dé, Denis Dennehy, Yanqing Duan, Rameshwar Dubey, Rohita Dwivedi, John S. Edwards, Carlos Flavián, Robin Gauld, Varun Grover, Mei-Chih Hu, Marijn Janssen, Paul Jones, Iris Junglas, Sangeeth Khorana, Sascha Kraus, Kai R. Larsen, Paul Latreille, Sven Laumer, F. Tegwen Malik, Abbas Mardani, Marcello Mariani, Sunil Mithas, Emmanuel Mogaji, Jeretta Horn Nord, Siobhan O'Connor, Fezvi Okumus, Margherita Pagani, Neeraj Pandey, Savvas Papagiannidis, Ilias O. Pappas, Nishith Pathak, Jan Pries-Heje, Ramakrishnan Raman, Nripendra P. Rana, Sven-Volker Rehm, Samuel Ribeiro-Navarrete, Alexander Richter, Frantz Rowe, Suprateek Sarker, Bernd Carsten Stahl, Manoj Kumar Tiwari, Wil van der Aalst, Viswanath Venkatesh, Giampaolo Viglia, Michael Wade, Paul Walton, Jochen Wirtz, and Ryan Wright. 2023. Opinion Paper: “So what if ChatGPT wrote it?” Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management* 71 (2023), 102642. <https://doi.org/10.1016/j.ijinfomgt.2023.102642>
- [31] Amy Eguchi, Hiroyuki Okada, and Yumiko Muto. 2021. Contextualizing AI education for K-12 students to enhance their learning of AI literacy through culturally responsive approaches. *KI-Künstliche Intelligenz* 35, 2 (2021), 153–161.
- [32] Vamsidhar Enireddy, C. Karthikeyan, and Ramkumar Jb. 2022. Automated Chatbots for Autism Spectrum Disorder Using AI Assistance. *Artificial Intelligence and the Fourth Industrial Revolution* (2022), 153.
- [33] Vinitha Gadiraaju, Shaun Kane, Sunipa Dev, Alex Taylor, Ding Wang, Emily Denton, and Robin Brewer. 2023. “I Wouldn’t Say Offensive but...”: Disability-Centered Perspectives on Large Language Models. In *Proceedings of the 2023 ACM Conference on Fairness, Accountability, and Transparency* (Chicago, IL, USA) (FAccT '23). Association for Computing Machinery, New York, NY, USA, 205–216. <https://doi.org/10.1145/3593013.3593989>
- [34] Nikhil Garg, Linda Schiebinger, Dan Jurafsky, and James Zou. 2018. Word embeddings quantify 100 years of gender and ethnic stereotypes. *Proceedings of the National Academy of Sciences* 115, 16 (2018), E3635–E3644. <https://doi.org/10.1073/pnas.1720347115> arXiv:<https://www.pnas.org/doi/pdf/10.1073/pnas.1720347115>
- [35] Ismael Garrido-Muñoz, Arturo Montejío-Ráez, Fernando Martínez-Santiago, and L. Alfonso Ureña-López. 2021. A Survey on Bias in Deep NLP. *Applied Sciences* 11, 7 (2021). <https://doi.org/10.3390/app11073184>
- [36] David Gefen and Orakwue (Bay) Arinze. 2023. ChatGPT and usurping academic authority. *Journal of Information Technology Case and Application Research* 25, 1 (2023), 3–9. <https://doi.org/10.1080/15228053.2023.2186629> arXiv:<https://doi.org/10.1080/15228053.2023.2186629>
- [37] Samuel Gehman, Suchin Gururangan, Maarten Sap, Yejin Choi, and Noah A. Smith. 2020. RealToxicityPrompts: Evaluating Neural Toxic Degeneration in Language Models. In *Findings of the Association for Computational Linguistics: EMNLP 2020*. Association for Computational Linguistics, Online, 3356–3369. <https://doi.org/10.18653/v1/2020.findings-emnlp.301>
- [38] Linda G Gottermeier and S Kushalnagar Raja. 2016. User evaluation of automatic speech recognition systems for deaf-hearing interactions at school and work. *Audiology Today* 28, 2 (2016), 20–34.
- [39] Anhong Guo, Ece Kamar, Jennifer Wortman Vaughan, Hanna Wallach, and Meredith Ringel Morris. 2020. Toward Fairness in AI for People with Disabilities SBG@ a Research Roadmap. *SIGACCESS Access. Comput.* 125, Article 2 (mar 2020), 1 pages. <https://doi.org/10.1145/3386296.3386298>
- [40] Danna Gurari, Qing Li, Abigale J. Stangl, Anhong Guo, Chi Lin, Kristen Grauman, Jiebo Luo, and Jeffrey P. Bigham. 2018. VizWiz Grand Challenge: Answering Visual Questions From Blind People. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*.
- [41] Sid Ahmed Hadri and Abdelkrim Bouramoul. 2023. Towards a deep learning based contextual chat bot for preventing depression in young children with autistic spectrum disorder. *Smart Health* 27 (2023), 100371. <https://doi.org/10.1016/j.smhl.2022.100371>
- [42] Alex Hanna, Emily Denton, Andrew Smart, and Jamila Smith-Loud. 2020. Towards a Critical Race Methodology in Algorithmic Fairness. In *Proceedings of the 2020 Conference on Fairness, Accountability, and Transparency* (Barcelona, Spain) (FAT* '20). Association for Computing Machinery, New York, NY, USA, 501–512. <https://doi.org/10.1145/3351095.3372826>
- [43] HiKi. accessed 2023. HiKi. Retrieved September 09, 2022 from <https://www.hikiapp.com/>
- [44] Karen Holtzblatt and Hugh Beyer. 1997. *Contextual design: defining customer-centered systems*. Elsevier.
- [45] Hwajung Hong, Eric Gilbert, Gregory D. Abowd, and Rosa I. Arriaga. 2015. In-Group Questions and Out-Group Answers: Crowdsourcing Daily Living Advice for Individuals with Autism. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems* (Seoul, Republic of Korea) (CHI '15). Association for Computing Machinery, New York, NY, USA, 777–786. <https://doi.org/10.1145/2702123.2702402>
- [46] Hwajung Hong, Jennifer G. Kim, Gregory D. Abowd, and Rosa I. Arriaga. 2012. Designing a Social Network to Support the Independence of Young Adults with Autism. In *Proceedings of the ACM 2012 Conference on Computer Supported Cooperative Work* (Seattle, Washington, USA) (CSCW '12). Association for Computing Machinery, New York, NY, USA, 627–636. <https://doi.org/10.1145/2145204.2145300>
- [47] Hwajung Hong, Svetlana Yarosh, Jennifer G. Kim, Gregory D. Abowd, and Rosa I. Arriaga. 2013. Investigating the Use of Circles in Social Networks to Support Independence of Individuals with Autism. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (Paris, France) (CHI '13). Association for Computing Machinery, New York, NY, USA, 3207–3216. <https://doi.org/10.1145/2470654.2466439>
- [48] AMANDA HOOVER and SAMANTHA SPENGLER. accessed 2023. *For Some Autistic People, ChatGPT Is a Lifeline*. Retrieved September 09, 2023 from <https://www.wired.com/story/for-some-autistic-people-chatgpt-is-a-lifeline/>
- [49] Patricia Howlin. 2003. Outcome in high-functioning adults with autism with and without early language delays: Implications for the differentiation between autism and Asperger syndrome. *Journal of autism and developmental disorders* 33 (2003), 3–13.
- [50] Ann X. Huang, Tammy L. Hughes, Lawrence R. Sutton, Marissa Lawrence, Xiaohan Chen, Zhe Ji, and Waganesh Zeleke. 2017. Understanding the Self in Individuals with Autism Spectrum Disorders (ASD): A Review of Literature.

- [51] Ben Hutchinson, Vinodkumar Prabhakaran, Emily Denton, Kellie Webster, Yu Zhong, and Stephen Denyul. 2020. Unintended Machine Learning Biases as Social Barriers for Persons with Disabilities. *SIGACCESS Access. Comput.* 125, Article 9 (mar 2020), 1 pages. <https://doi.org/10.1145/3386296.3386305>
- [52] Nazish Imran, Aateqa Hashmi, and Ahad Imran. 2023. Chat-GPT: Opportunities and Challenges in Child Mental Healthcare. *Pakistan Journal of Medical Sciences* 39, 4 (Jun. 2023). <https://doi.org/10.12669/pjms.39.4.8118>
- [53] Lost in my Mind TARDIS. Tumblr. accessed 2023. *PSA from the actual coiner of “neurodivergent”*. Retrieved September 09, 2023 from [https://sherlockslflatfect.tumblr.com/post/121295972384/psa-from-the-actual-coiner-of-neurodivergent](https://sherlockslflatffect.tumblr.com/post/121295972384/psa-from-the-actual-coiner-of-neurodivergent)
- [54] David Ireland, Dana Bradford, and Jeremy Farr-Wharton. 2018. Social Fringe Dwellers: Can chat-bots combat bullies to improve participation for children with autism? *The Journal of Community Informatics* 14, 1 (2018).
- [55] Ali Iskender. 2023. Holy or Unholy? Interview with Open AI’s ChatGPT. *European Journal of Tourism Research* 34 (Mar. 2023), 3414. <https://doi.org/10.54055/ejtr.v34i.3169>
- [56] Hernisa Kacorri. 2017. Teachable Machines for Accessibility. *SIGACCESS Access. Comput.* 119 (nov 2017), 10–18. <https://doi.org/10.1145/3167902.3167904>
- [57] Steven K Kapp, Kristen Gillespie-Lynch, Lauren E Sherman, and Ted Hutmam. 2013. Deficit, difference, or both? Autism and neurodiversity. *Developmental psychology* 49, 1 (2013), 59.
- [58] Enkelejda Kasneci, Kathrin Sessler, Stefan Küchemann, Maria Bannert, Daryna Dementieva, Frank Fischer, Urs Gasser, Georg Groh, Stephan Günemann, Eyke Hüllermeier, Stephan Krusche, Gitta Kutyniok, Tilman Michaeli, Claudia Nerdel, Jürgen Pfeffer, Oleksandra Poquet, Michael Sailer, Albrecht Schmidt, Tina Seidel, Matthias Städler, Jochen Weller, Jochen Kuhn, and Gjergji Kasneci. 2023. ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences* 103 (2023), 102274. <https://doi.org/10.1016/j.lindif.2023.102274>
- [59] Lorcan Kenny, Caroline Hattersley, Bonnie Molins, Carole Buckley, Carol Povey, and Elizabeth Pellicano. 2016. Which terms should be used to describe autism? Perspectives from the UK autism community. *Autism* 20, 4 (2016), 442–462.
- [60] Os Keyes. 2020. Automating autism: Disability, discourse, and artificial intelligence. *The Journal of Sociotechnical Critique* 1, 1 (2020), 8.
- [61] Seonghun Kim, Yeonju Jang, Woojin Kim, Seonyune Choi, Heeseok Jung, Soohwan Kim, and Hyeoncheol Kim. 2021. Why and What to Teach: AI Curriculum for Elementary School. *Proceedings of the AAAI Conference on Artificial Intelligence* 35, 17 (May 2021), 15569–15576. <https://doi.org/10.1609/aaai.v35i17.17833>
- [62] Oscar Koller, Jens Forster, and Hermann Ney. 2015. Continuous sign language recognition: Towards large vocabulary statistical recognition systems handling multiple signers. *Computer Vision and Image Understanding* 141, C (2015), 108–125. <https://doi.org/10.1016/j.cviu.2015.09.013>
- [63] Youjin Kong. 2022. Are “Intersectionally Fair” AI Algorithms Really Fair to Women of Color? A Philosophical Analysis. In *Proceedings of the 2022 ACM Conference on Fairness, Accountability, and Transparency* (Seoul, Republic of Korea) (FAccT ’22). Association for Computing Machinery, New York, NY, USA, 485–494. <https://doi.org/10.1145/3531146.3533114>
- [64] M. W. Krauss, M. M. Seltzer, and H. T. Jacobson. 2005. Adults with autism living at home or in non-family settings: positive and negative aspects of residential status. *Journal of Intellectual Disability Research* 49, 2 (2005), 111–124. <https://doi.org/10.1111/j.1365-2788.2004.00599.x>
- [65] Kathy Leadbitter, Karen Leneh Buckle, Ceri Ellis, and Martijn Dekker. 2021. Autistic Self-Advocacy and the Neurodiversity Movement: Implications for Autism Early Intervention Research and Practice. *Frontiers in Psychology* 12 (2021). <https://doi.org/10.3389/fpsyg.2021.635690>
- [66] Minha Lee, Sander Ackermans, Nena van As, Hanwen Chang, Enzo Lucas, and Wijnand IJsselstein. 2019. Caring for Vincent: A Chatbot for Self-Compassion. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (Glasgow, Scotland UK) (CHI ’19). Association for Computing Machinery, New York, NY, USA, 1–13. <https://doi.org/10.1145/3290605.3300932>
- [67] Sunok Lee, Dason Choi, Minha Lee, Jonghak Choi, and Sangsu Lee. 2023. Fostering Youth’s Critical Thinking Competency About AI through Exhibition. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (Hamburg, Germany) (CHI ’23). Association for Computing Machinery, New York, NY, USA, Article 451, 22 pages. <https://doi.org/10.1145/3544548.3581159>
- [68] Duri Long, Takeria Blunt, and Brian Magerko. 2021. Co-Designing AI Literacy Exhibits for Informal Learning Spaces. *Proc. ACM Hum.-Comput. Interact.* 5, CSCW2, Article 293 (oct 2021), 35 pages. <https://doi.org/10.1145/3476034>
- [69] Duri Long, Mikhail Jacob, and Brian Magerko. 2019. Designing Co-Creative AI for Public Spaces. In *Proceedings of the 2019 Conference on Creativity and Cognition* (San Diego, CA, USA) (C&C ’19). Association for Computing Machinery, New York, NY, USA, 271–284. <https://doi.org/10.1145/3325480.3325504>
- [70] Duri Long and Brian Magerko. 2020. What is AI Literacy? Competencies and Design Considerations. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems* (Honolulu, HI, USA) (CHI ’20). Association for Computing Machinery, New York, NY, USA, 1–16. <https://doi.org/10.1145/3313831.3376727>
- [71] Duri Long, Anthony Teachey, and Brian Magerko. 2022. Family Learning Talk in AI Literacy Learning Activities. In *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems* (New Orleans, LA, USA) (CHI ’22). Association for Computing Machinery, New York, NY, USA, Article 226, 20 pages. <https://doi.org/10.1145/3491102.3502091>
- [72] Chandler May, Alex Wang, Shikha Bordia, Samuel R. Bowman, and Rachel Rudinger. 2019. On Measuring Social Biases in Sentence Encoders. In *Proceedings of the 2019 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies, Volume 1 (Long and Short Papers)*. Association for Computational Linguistics, Minneapolis, Minnesota, 622–628. <https://doi.org/10.18653/v1/N19-1063>
- [73] Ninareh Mehrabi, Fred Morstatter, Nripsuta Saxena, Kristina Lerman, and Aram Galstyan. 2021. A Survey on Bias and Fairness in Machine Learning. *ACM Comput. Surv.* 54, 6, Article 115 (Jul 2021), 35 pages. <https://doi.org/10.1145/3457607>
- [74] Sewon Min, Xinxi Lyu, Ari Holtzman, Mikel Artetxe, Mike Lewis, Hannaneh Hajishirzi, and Luke Zettlemoyer. 2022. Rethinking the Role of Demonstrations: What Makes In-Context Learning Work? In *Proceedings of the 2022 Conference on Empirical Methods in Natural Language Processing*. Association for Computational Linguistics, Abu Dhabi, United Arab Emirates, 11048–11064. <https://doi.org/10.18653/v1/2022.emnlp-main.759>
- [75] Virginia Department of Education. accessed 2023. *Autism Spectrum Disorders and the Transition to Adulthood*. Retrieved September 09, 2023 from <https://www.doe.virginia.gov/programs-services/special-education/specific-disabilities/autism>
- [76] OpenAI. accessed 2023. *Our approach to alignment research*. Retrieved September 09, 2023 from <https://openai.com/blog/our-approach-to-alignment-research>
- [77] Xinru Page, Andrew Capener, Spring Cullen, Tao Wang, Monica Garfield, and Pamela J. Wisniewski. 2022. Perceiving Affordances Differently: The Unintended Consequences When Young Autistic Adults Engage with Social Media. In *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems* (New Orleans, LA, USA) (CHI ’22). Association for Computing Machinery, New York, NY, USA, Article 144, 21 pages. <https://doi.org/10.1145/3491102.3517596>
- [78] Roberto Palma, Ho Ching Lam, Ashima Shrivastava, Ethan Karlinsky, Kohl Nguyen, Prab Deol, Moushumi Sharmin, and Shameem Ahmed. 2023. “Monday Feels Like Friday!” - Towards Overcoming Anxiety and Stress of Autistic Young Adults During Times of Isolation. In *Information for a Better World: Normality, Virtuality, Physicality, Inclusivity*, Isaac Sserwanga, Anne Goulding, Heather Moulaison-Sandy, Jia Tina Du, António Lucas Soares, Viviane Hessami, and Rebecca D. Frank (Eds.). Springer Nature Switzerland, Cham, 286–305.
- [79] Annemiek Palmen, Robert Didden, and Marieke Arts. 2008. Improving question asking in high-functioning adolescents with autism spectrum disorders: Effectiveness of small-group training. *Autism* 12, 1 (2008), 83–98. <https://doi.org/10.1177/1362361307085265> arXiv:<https://doi.org/10.1177/1362361307085265> PMID: 18178598.
- [80] Parvaneh Parvin, Marco Manca, Caterina Senette, Maria Claudia Buzzi, Marina Buzzi, and Susanna Pelagatti. 2022. Alexism: ALEXa Supporting Children with AutISM in Their Oral Care at Home. In *Proceedings of the 2022 International Conference on Advanced Visual Interfaces* (Frascati, Rome, Italy) (AVI 2022). Association for Computing Machinery, New York, NY, USA, Article 18, 5 pages. <https://doi.org/10.1145/3531073.3531157>
- [81] Malinda L Pennington, Douglas Cullinan, Louise B Southern, et al. 2014. Defining autism: variability in state education agency definitions of and evaluations for autism spectrum disorders. *Autism research and treatment* 2014 (2014).
- [82] Organizers Of Queerinai, Anaelia Ovalle, Arjun Subramonian, Ashwin Singh, Claas Voelcker, Danica J. Sutherland, Davide Locatelli, Eva Breznik, Filip Klubicka, Hang Yuan, Hetvi J. Huan Zhang, Jaidev Shiram, Kruno Lehman, Luca Soldaini, Maarten Sap, Marc Peter Deisenroth, Maria Leonor Pacheco, Maria Ryskina, Martin Mundt, Milind Agarwal, Nyx Mclean, Pan Xu, A Pranav, Raj Korpan, Ruchiira Ray, Sarah Mathew, Sarthak Arora, St John, Tanvi Anand, Vishakha Agrawal, William Agnew, Yanan Long, Zijie J. Wang, Zeerak Talat, Avijit Ghosh, Nathaniel Dennler, Michael Noseworthy, Sharvari Jha, Emi Baylor, Aditya Joshi, Natalia Y. Bilenko, Andrew McNamara, Raphael Gontijo-Lopes, Alex Markham, Evn Dong, Jackie Kay, Manu Saraswat, Nikhil Vytlal, and Luke Stark. 2023. Queer In AI: A Case Study in Community-Led Participatory AI. In *Proceedings of the 2023 ACM Conference on Fairness, Accountability, and Transparency* (Chicago, IL, USA) (FAccT ’23). Association for Computing Machinery, New York, NY, USA, 1882–1895. <https://doi.org/10.1145/3593013.3594134>
- [83] Simon Razniewski, Andrew Yates, Nora Kassner, and Gerhard Weikum. 2021. Language models as or for knowledge bases. *arXiv preprint arXiv:2110.04888* (2021).
- [84] reddit post. accessed 2023. *ChatGPT as a tool for autistics!!* Retrieved September 09, 2023 from https://www.reddit.com/r/autism/comments/10wv1rl/chatgpt_as_a_tool_for_autistics/?rdt=55984

- [85] Kathryn E. Ringland. 2019. A Place to Play: The (Dis)Abled Embodied Experience for Autistic Children in Online Spaces. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (Glasgow, Scotland Uk) (*CHI '19*). Association for Computing Machinery, New York, NY, USA, 1–14. <https://doi.org/10.1145/3290605.3300518>
- [86] Kathryn E. Ringland, Christine T. Wolf, Heather Fauchett, Lynn Dombrowski, and Gillian R. Hayes. 2016. "Will I Always Be Not Social?": Re-Conceptualizing Sociality in the Context of a Minecraft Community for Autism. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (San Jose, California, USA) (*CHI '16*). Association for Computing Machinery, New York, NY, USA, 1256–1269. <https://doi.org/10.1145/2858036.2858038>
- [87] Stephen Roller, Emily Dinan, Naman Goyal, Da Ju, Mary Williamson, Yinhan Liu, Jing Xu, Myle Ott, Eric Michael Smith, Y-Lan Boureau, and Jason Weston. 2021. Recipes for Building an Open-Domain Chatbot. In *Proceedings of the 16th Conference of the European Chapter of the Association for Computational Linguistics: Main Volume*. Association for Computational Linguistics, Online, 300–325. <https://doi.org/10.18653/v1/2021.eacl-main.24>
- [88] Emma Sabzalieva and Arianna Valentini. 2023. ChatGPT and artificial intelligence in higher education: quick start guide. (2023).
- [89] Malik Sallam. 2023. ChatGPT utility in healthcare education, research, and practice: systematic review on the promising perspectives and valid concerns. In *Healthcare*, Vol. 11. MDPI, 887.
- [90] Will Simm, Maria Angela Ferrario, Adrian Gradinar, Marcia Tavares Smith, Stephen Forshaw, Ian Smith, and Jon Whittle. 2016. Anxiety and Autism: Towards Personalized Digital Health. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (San Jose, California, USA) (*CHI '16*). Association for Computing Machinery, New York, NY, USA, 1270–1281. <https://doi.org/10.1145/2858036.285259>
- [91] Jaemarie Solyst, Shixian Xie, Ellia Yang, Angela E.B. Stewart, Motahhare Eslami, Jessica Hammer, and Amy Ogan. 2023. "I Would Like to Design": Black Girls Analyzing and Ideating Fair and Accountable AI. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (Hamburg, Germany) (*CHI '23*). Association for Computing Machinery, New York, NY, USA, Article 452, 14 pages. <https://doi.org/10.1145/3544548.3581378>
- [92] MAXFIELD SPARROW. accessed 2023. *I EMBRACE MY ROBOT OVERLORDS (AND CHATGPT)*. Retrieved September 09, 2023 from <https://thinkingautismguide.com/2023/01/i-embrace-my-robot-overlords-and-chatgpt.html>
- [93] Katta Spiel, Emeline Brûlé, Christopher Frauenberger, Gilles Bailly, and Geraldine Fitzpatrick. 2018. Micro-Ethics for Participatory Design with Marginalised Children. In *Proceedings of the 15th Participatory Design Conference: Full Papers - Volume 1* (Hasselt and Genk, Belgium) (*PDC '18*). Association for Computing Machinery, New York, NY, USA, Article 17, 12 pages. <https://doi.org/10.1145/3210586.3210603>
- [94] Katta Spiel, Christopher Frauenberger, Os Keyes, and Geraldine Fitzpatrick. 2019. Agency of Autistic Children in Technology Research—A Critical Literature Review. *ACM Trans. Comput.-Hum. Interact.* 26, 6, Article 38 (nov 2019), 40 pages. <https://doi.org/10.1145/3344919>
- [95] Nisan Stiennon, Long Ouyang, Jeffrey Wu, Daniel Ziegler, Ryan Lowe, Chelsea Voss, Alec Radford, Dario Amodei, and Paul F Christiano. 2020. Learning to summarize with human feedback. In *Advances in Neural Information Processing Systems*, H. Larochelle, M. Ranzato, R. Hadsell, M.F. Balcan, and H. Lin (Eds.), Vol. 33. Curran Associates, Inc., 3008–3021. https://proceedings.neurips.cc/paper_files/paper/2020/file/1f89885d56929e98d3ef9b86448f951-Paper.pdf
- [96] Rachael Tatman. 2017. Gender and Dialect Bias in YouTube's Automatic Captions. In *Proceedings of the First ACL Workshop on Ethics in Natural Language Processing*. Association for Computational Linguistics, Valencia, Spain, 53–59. <https://doi.org/10.18653/v1/W17-1606>
- [97] David Touretzky, Christina Gardner-McCune, Fred Martin, and Deborah Seehorn. 2019. Envisioning AI for K-12: What Should Every Child Know about AI? *Proceedings of the AAAI Conference on Artificial Intelligence* 33, 01 (Jul. 2019), 9795–9799. <https://doi.org/10.1609/aaai.v33i01.33019795>
- [98] David Touretzky, Christina Gardner-McCune, Fred Martin, and Deborah Seehorn. 2019. Envisioning AI for K-12: What should every child know about AI? In *Proceedings of the AAAI conference on artificial intelligence*, Vol. 33. 9795–9799.
- [99] Jutta Treviranus. 2017. Are we Teaching our Machines our Biases. Presumptions and Stereotypes? *Global Journal of Intellectual & Developmental Disabilities* 1, 2 (May 2017), 28–29. <https://doi.org/10.19080/GJIDD.2017.01.55>
- [100] Jutta Treviranus. accessed 2023. *Sidewalk Toronto and Why Smarter is Not Better**. Retrieved September 09, 2023 from <https://medium.datadriveninvestor.com/sidewalk-toronto-and-why-smarter-is-not-better-b233058d01c8>
- [101] Shari Trewin. 2018. AI fairness for people with disabilities: Point of view. *arXiv preprint arXiv:1811.10670* (2018).
- [102] Eva AM Van Dis, Johan Bollen, Willem Zuidema, Robert van Rooij, and Claudi L Bockting. 2023. ChatGPT: five priorities for research. *Nature* 614, 7947 (2023), 224–226.
- [103] Umut Pajaro Velasquez. 2023. Queering the law: How to make AI with a Queer Perspective from the Global Majority. In *Submitted to Open Infrastructure Fund / Fondo de Infraestructura Abierta*. <https://openreview.net/forum?id=RHIrUE2c1o> under review.
- [104] G Wadley, Stefan SCHUTT, and Lye Ee Ng. 2016. The Freedom to Be Yourself: Technology-Themed Social Spaces for Young People with High-Functioning Autism. *Autism and Technology: Beyond Assistance & Intervention* (2016).
- [105] Changyu Wang, Siru Liu, Hao Yang, Jiulin Guo, Yuxuan Wu, and Jialin Liu. 2023. Ethical Considerations of Using ChatGPT in Health Care. *J Med Internet Res* 25 (11 Aug 2023), e48009. <https://doi.org/10.2196/48009>
- [106] Jason Wei, Xuezhi Wang, Dale Schuurmans, Maarten Bosma, brian ichter, Fei Xia, Ed Chi, Quoc V Le, and Denny Zhou. 2022. Chain-of-Thought Prompting Elicits Reasoning in Large Language Models. In *Advances in Neural Information Processing Systems*, S. Koyejo, S. Mohamed, A. Agarwal, D. Belgrave, K. Cho, and A. Oh (Eds.), Vol. 35. Curran Associates, Inc., 24824–24837. https://proceedings.neurips.cc/paper_files/paper/2022/file/9d5609613524ecfcf15af0f7b31abc4-Paper-Conference.pdf
- [107] Laura Weidinger, John Mellor, Maribeth Rauh, Conor Griffin, Jonathan Uesato, Po-Sen Huang, Myra Cheng, Mia Glæse, Borja Balle, Atoosa Kasirzadeh, et al. 2021. Ethical and social risks of harm from language models. *arXiv preprint arXiv:2112.04359* (2021).
- [108] Paul Whiteley, Lynda Todd, Kevin Carr, and Paul Shattock. 2010. Gender ratios in autism, Asperger syndrome and autism spectrum disorder. *Autism Insights* 2 (2010), 17.
- [109] Meredith Whittaker, Meryl Alper, Cynthia L Bennett, Sara Hendren, Liz Kaziunas, Mara Mills, et al. 2019. Disability, bias, and AI. (2019).
- [110] Cara Wilson, Margot Brereton, Bernd Ploderer, and Laurianne Sitbon. 2019. Co-Design Beyond Words: 'Moments of Interaction' with Minimally-Verbal Children on the Autism Spectrum. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (Glasgow, Scotland Uk) (*CHI '19*). Association for Computing Machinery, New York, NY, USA, 1–15. <https://doi.org/10.1145/3290605.3300251>
- [111] Sang Michael Xie, Aditi Raghunathan, Percy Liang, and Tengyu Ma. 2022. An Explanation of In-context Learning as Implicit Bayesian Inference. In *International Conference on Learning Representations*. <https://openreview.net/forum?id=RdJVFCJUMI>
- [112] Hee-Jeong Yoo, Geonho Bahn, In-Hee Cho, Eun-Kyung Kim, Joo-Hyun Kim, Jung-Won Min, Won-Hye Lee, Jun-Seong Seo, Sang-Shin Jun, Guiyoung Bong, Soochurl Cho, Min-Sup Shin, Bung-Nyun Kim, Jae-Won Kim, Subin Park, and Elizabeth A. Laugeson. 2014. A Randomized Controlled Trial of the Korean Version of the PEERS® Parent-Assisted Social Skills Training Program for Teens With ASD. *Autism Research* 7, 1 (2014), 145–161. <https://doi.org/10.1002/aur.1354>
- [113] J.D. Zamfirescu-Pereira, Richmond Y Wong, Bjoern Hartmann, and Qian Yang. 2023. Why Johnny Can't Prompt: How Non-AI Experts Try (and Fail) to Design LLM Prompts. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (Hamburg, Germany) (*CHI '23*). Association for Computing Machinery, New York, NY, USA, Article 437, 21 pages. <https://doi.org/10.1145/3544548.3581388>
- [114] Ce Zhou, Qian Li, Chen Li, Jun Yu, Yixin Liu, Guangjing Wang, Kai Zhang, Cheng Ji, Qiben Yan, Lifang He, et al. 2023. A comprehensive survey on pre-trained foundation models: A history from bert to chatgpt. *arXiv preprint arXiv:2302.09419* (2023).
- [115] Jianlong Zhou, Heimo Müller, Andreas Holzinger, and Fang Chen. 2023. Ethical ChatGPT: Concerns, challenges, and commandments. *arXiv preprint arXiv:2305.10646* (2023).
- [116] Terry Yue Zhuo, Yujin Huang, Chunyang Chen, and Zhenchang Xing. 2023. Exploring ai ethics of chatgpt: A diagnostic analysis. *arXiv preprint arXiv:2301.12867* (2023).

A INTERVIEW QUESTIONNAIRE

A.1 Focus Group Interview Questionnaire

A.1.1 Understanding and Experience with AI.

- Have you heard about AI before? If so, how did you learn about it?
- What do you think AI is? Please write or draw what comes to mind when you think of AI.
- Have you used or experienced AI? What kind of AI have you used, and in what situations?
- Do you feel that AI is closely related to your life and daily routine? How significant do you think the impact of AI is on your life?

- Have you experienced or do you anticipate any positive impacts or benefits of AI in your daily life?
- Have you experienced or do you anticipate any negative impacts or challenges of AI in your daily life?
- Do you have any personal rules or criteria for using AI? If so, could you describe the events or experiences that have shaped these rules or criteria?

A.1.2 *(After Introducing ChatGPT) First Impressions and Thoughts about ChatGPT.*

- What is your (first) impression of ChatGPT?
- Are you interested in using ChatGPT?
- Do you think ChatGPT can enrich your everyday life? In what aspects of your daily life do you think it would be most useful?
- Do you have any concerns or worries about using ChatGPT?

A.2 Workshop Debriefing Interview Questionnaire

- Which conversation with ChatGPT today did you find most satisfying?
- Were there any conversations with ChatGPT today that disappointed or displeased you?
- Do you plan to continue using ChatGPT after the workshop? In which specific areas or aspects of your life do you expect to use this technology?
- If you have no intention to continue using ChatGPT, what are the main reasons?
- Are there any challenges or risks that concern you about using ChatGPT?
- Did participating in the workshop give you new insights about ChatGPT or AI technology?
- Have there been any changes in your perceptions and attitudes towards using ChatGPT in your everyday life when compared to before the workshop?

B ORIGINAL WORKSHEET OF PARTICIPANTS

Weekly schedule for next week

월	화	수	목	금	토	일
				야구경기 집회 참석		

여행

독서

어학 공부

체중 감량

+ 스펙, 이력 (공모전)

How can I use ChatGPT in my daily life?

사람 만나는게 조심스러운
(조별과제)

집중력이 약함.
(불필요한 광고 차단)

강아지 건강관리

투자/돈 관리

국이크

여자를 어떻게 생각해
걸고할지

여자를 상대하는 것을
연습하고 싶음

ChatGPT -

나의 선 애니 까지만
해도 좋으지.

간호로인

공부 학습 스트레스

학급 대인관계, 통학 스트레스

와 상황에, 대처법에
에 맞게 어떤 대처
에 가능할지

가족이랑

시간

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식습관

부당감

압박감

집중력

기억력

생각력

창의력

기교

인내

기상

기분

기운

기력

<p

(A) Original worksheet of P1

(B) Original worksheet of P9