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Embracing Neurodiversity in Psychedelic Science: A Mixed-Methods Inquiry into the MDMA Experiences of Autistic Adults

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ABSTRACT

This exploratory inquiry analyzed subjective experiences autistic adults reported after they took the drug 3,4-methylenedioxymethamphetamine (MDMA), also known as ecstasy, in nonclinical settings. Using a secure, globally available website, this study collected data from participants in 13 countries who were experienced with MDMA ($n = 100$). A subset of survey respondents ($n = 24$) were then invited to participate in qualitative interviews. The researcher applied thematic content analysis of interview transcripts to create a comprehensive account of emergent themes. MDMA has well-documented acute effects that promote pro-social attitudes such as caring and trust in neurotypical, or typically developing, populations. Findings from this study suggested that MDMA-assisted therapy may be an effective catalyst in autistic adults for intra- and interpersonal change. In addition, participants reported accounts of lasting transformation and healing from conditions such as trauma and social anxiety that are common in autistic populations. No participants reported long-term adverse outcomes as a result of using MDMA/ecstasy. Qualitative findings support a case for future clinical trials of MDMA-assisted therapy with autistic adults who present with social adaptability challenges.

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Introduction

This report summarizes doctoral dissertation research conducted from 2011–2013 (Danforth 2013) that later provided foundational content in support of a Phase 2 pilot study of MDMA-assisted therapy for social anxiety in autistic adults (Danforth et al. 2016, 2018). The purpose of the preliminary qualitative research was to explore how autistic adults experience the subjective effects of the drug 3,4-methylenedioxymethamphetamine (MDMA), which is also known as the street drug ecstasy or Molly, in non-clinical settings. The goals were to document a comprehensive analysis of emergent themes, highlight themes of clinical relevance to potential future investigations, and include neurodivergent adult populations in the emerging field of MDMA research. Participants were asked to describe in detail what taking MDMA/ecstasy was like for them. They were also asked about any changes they noticed after the experience. Was MDMA/ecstasy helpful? Was it problematic? Did taking MDMA/ecstasy result in long-term changes in attitudes or behaviors?

Autism is a broad term to describe heterogeneous and pervasive neurocognitive differences. The etiology of autism is unknown, although research indicates that both genetic and environmental causative factors contribute (Newschaffer et al. 2007). Multimodal treatment regimens can be developed to meet the needs of individuals, depending on factors such as the degree of social skills challenges and presenting symptoms of other conditions, such as depression and anxiety (Tsai 2007). In the text that follows, identity-first ("autistic person") as opposed to person-first ("person with autism") language is intended as an identity-affirming and non-pathologizing preference (Dunn and Andrews 2015).

A growing body of research (Dziobek et al. 2008; Schulte-Rüther et al. 2013; Smith 2009; Song and Hakoda 2018) and testimonial accounts from autistic individuals, their family members, and allies support the view that popular assumptions about affective experiences and an absence of empathy related to autism often are inaccurate. A more accurate assessment would be that their emotional and empathic experiences and processing are qualitatively different from those of the neurotypical, or typically developing, majority. As a result, autistic individuals often struggle with social relationships in ways that are distressing and which can become a source of anxiety and result in isolation.

The synthetic *phenethylamine* compound *3, 4-Methylenedioxymethamphetamie* (MDMA) (also known as ecstasy, E, Molly), is a Schedule 1 controlled substance. MDMA can produce acute psychological effects which are

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similar to those of classic *hallucinogens*, a class of drugs that produce responses such as enhanced mood and increased intensity of emotions, increased sensory awareness and arousal, and mild to moderate derealization (Sumnall, Cole, and Jerome 2006; Vollenweider et al. 1998). However, MDMA causes fewer and attenuated hallucinogenic effects (Nichols 1986) with less cognitive distortion (Grinspoon and Bakalar 1986).

Unlike classic hallucinogens, such as LSD (lysergic acid diethylamide) and psilocybin (4-phosphoryloxy-*N,N*-dimethyltryptamine), MDMA has never been considered *psychotomimetic* (mimicking psychosis). MDMA also produces subjective empathogenic effects that are distinct. For example, Vollenweider et al. (1998) reported that MDMA produced acute "increased responsiveness to emotions, a heightened openness, and a sense of closeness to other people" (247). MDMA is less likely to cause problematic anxiety (Johansen and Krebs 2009), and the duration of effects is shorter than with most other psychedelics, which may be advantageous in clinical settings. Unlike amphetamines, MDMA is not considered physically addictive, but there have been reports of both acute and chronic psychological abreactions in vulnerable individuals (Parrott 2007).

Drawbacks of MDMA include a potential for risky recreational use and abuse (Halpern et al. 2010). Also, the debate in the literature over potential neurotoxicity with MDMA remains unresolved. Some researchers report no evidence of notable harm from low-dose and infrequent use (de Win et al. 2007; Halpern et al. 2011). More recently, Den Hollander et al. (2012) published preliminary evidence that suggested chronic use might result in hippocampal damage. A number of health and safety issues, such as potential depressed moods during neurotransmitter post-session recovery periods, are still under investigation regarding the psychotherapeutic potential of MDMA for any population (Vizeli and Liechti 2017).

Riedlinger (1985) was an early proponent of research on MDMA as an adjunctive intervention for individuals on the autism spectrum. However, under the United States Drug Enforcement Administration's Comprehensive Controlled Substances Act of 1970, MDMA was designated as a Schedule I compound in the most restricted category in 1986, before any autism-related studies with MDMA were published. As a result, clinical research efforts have been limited to date. Prior to data collection for the present study, a search of the Cambridge Scientific Abstracts, Proquest, EBSCO, and other scholarly research databases did not yield published results from clinical trials of MDMA with an adult autistic population.

Methods

Screening, eligibility, and participants

The Internet functions as a communication hub for the autistic community (Davidson 2008). Therefore, posting announcements online in both autism-related and drug interest forums as well as social media sites was the primary method of recruitment. Participants submitted quantitative data via online surveys after completing a consent form and brief quiz to confirm comprehension of the content of the form. Individuals who self-reported that they were autistic and received a score of 32 or higher on the Autism-Spectrum Quotient (AQ) (Baron-Cohen et al. 2001; Hoekstra et al. 2008) were invited to complete a general research and demographic survey. All data were collected through a secure, globally available website. Participants from 13 countries submitted surveys, including 100 MDMA/ecstasy-experienced individuals (76% males; 24% females). Participants' ages ranged from 21 to 74 years. Study procedures were approved by the Research Ethics Committee at the Institute of Transpersonal Psychology.

Concurrent with survey data collection, 24 autistic adults who had the ability to communicate verbally in English participated in semi-structured interviews about their experiences with MDMA/ecstasy. For recruitment, the researcher sent an e-mail invitation to the first 30 respondents with no history of major psychotic disorder who were between the ages of 21–75, scored 32 or higher on the Autism-Spectrum Quotient, reported prior MDMA/ecstasy use not in excess of 49 times, and indicated in a survey question response their willingness to be contacted for an interview. One interviewee was introduced to the researcher directly through a mutual acquaintance. The objective, allowing for attrition, was to complete interviews with a minimum of 24 individuals.

To enhance empathic understanding of interviewee experiences, within five days after interview sessions concluded, the researcher employed an embodied transcription technique (Brooks 2010), in which the researcher listened to the recording of the interview using a headset and voiced the participant's responses verbatim. The researcher transcribed interviews simultaneously into Microsoft Word files using Dragon Naturally Speaking 11.0 voice-recognition software and then completed accuracy checks of all interviews by reading transcriptions and comparing them to the complete recordings.

For the content analysis of the transcribed interviews, Applied Thematic Analysis (Guest, MacQueen, and Namey 2012) was completed manually and with the aid of an online qualitative data analysis application (http://www.dedoose.com). Meaning units from the

transcript text were cataloged in a codebook. Two independent, MDMA-neutral intercoders coded 17% of the transcripts without prior review of the draft codebook. The codebook was revised as needed to reflect reviewer agreement. For the final codebook, interrater reliability (IRR) was considered sufficient with an IRR of ≥ 80% agreement between coders on 95% of the codes.

The lists of the emergent metathemes, themes, and subthemes were finalized after the researcher completed three in-depth analyses of each transcript over 11 months. All interviewees were invited to participate in a member-checking review of the qualitative findings report for accuracy, level of researcher respect, and appropriateness of the presentation. The six participants who returned feedback confirmed that the findings were presented in an accurate manner that reflected their experiences to their satisfaction.

Results

Summary of quantitative findings

Participants who had used MDMA/ecstasy were asked to report on the total number of times used. The most frequent response was 11–20 times (43%). The exclusion limit for enrollment was MDMA/ecstasy use in excess of 50 times. A total of 57% of respondents reported using MDMA/ecstasy 10 or fewer times. One notable finding was that no participants chose the "21–50 times" response option, which might be suggestive of self-limiting patterns of recreational use in this population.

Participants in the MDMA/ecstasy-experienced group were asked to indicate which items from a list of commonly reported acute subjective and physiological MDMA effects, if any, they recalled experiencing when they took MDMA/ecstasy (see Table 1). The acute effects reported by participants were consistent with known effects for MDMA, increasing confidence that participants had actually consumed MDMA rather than some other drug. Most participants (69%) were "Highly Confident" that the substance they took contained MDMA, and another 22% were "Fairly Confident." Most respondents (91%) reported that they experienced "Increased Feelings of Empathy/Connectedness," and 86% indicated "Ease of Communication" as an effect of their MDMA/ecstasy use.

Table 1. Acute effects of MDMA/ecstasy use reported by adults on the autism spectrum.

Effect during MDMA/ecstasy use	Recalled (*N* = 100) %	Not reported (*N* = 100) %
Euphoria	94	6
Increased feelings of empathy/ connectedness	91	9
Increased energy	88	12
Increased smiling	88	12
Ease of communication	86	14
Increased body temperature	73	27
Jaw clenching	70	30
Increased heart rate	66	34
Laughter	63	37
Nystagmus (eye wiggles)	51	49
Restlessness	49	51
Anxiety	24	76

Table 2 includes data about the intensity measured with a 0–6 Likert-type scale of effects experienced during MDMA/ecstasy experiences. Positive effects (e.g., joy, openness, enjoying being touched) were reported as more strongly experienced in all examples, whereas no participants reported strongly experiencing anxiety. Some of the more interesting data are found in the "0 = Did Not Experience column." For example, only 2% of participants reported that they did not experience "feeling more emotions than usual," and only 2% indicated that finding it "easier than usual to talk with others" was not a feature of their MDMA/ecstasy experience.

As shown in Table 3, some participants reported durable benefits from MDMA/ecstasy use. A notable finding was that 72% of MDMA/ecstasy-experienced participants reported "more comfort in social settings," and 12% indicated that the effect lasted for two or more years. Further, 78% of the MDMA/ecstasy-experienced group reported "feeling at ease in my own body" as an effect, and 15% indicated that the effect lasted two years or longer.

A finding that may have relevance to establishing rapport with therapists in clinical settings was that 77% of the MDMA/ecstasy-experienced group reported that they found it "easier than usual to talk to others" as an effect of taking MDMA/ecstasy, and 18% indicated that the effect lasted up to one year or longer. Another finding that could have implications for psychotherapy for autistic adults was that 22% of the MDMA/ecstasy-experienced group reported "increased insight into own thought processes" that persisted for two or more years.

Undesired effects and outcomes were reported infrequently. These included mild to moderate disappointment that the experience did not meet expectations, transient difficulties or distress, feelings of a "come down" after pleasurable effects subsided, periods of "overwhelm" of varying durations when acute effects were present, and fears of the possibility of overdisclosure based on MDMA's reputation of facilitating open communication.

Summary of qualitative findings

The data sources for the qualitative findings included 24 semi-structured interviews with participants presumed to

Table 2. Intensity of effects autistic adults reported experiencing during MDMA/ecstasy (N = 100).

Effect	0–Did not experience	1	2	3	4	5	6–Strongly experienced %
Increased insight into own thought processes	10	4	6	10	17	16	37
Joy	3	1	1	4	14	14	63
Feeling more emotions than usual	2	2	4	4	14	22	52
Getting a sense of how others feel	8	6	6	7	23	20	30
Anxiousness	39	21	20	12	4	4	0
Understanding why others feel the way they do	16	7	4	18	17	16	22
Openness	3	2	2	0	12	22	59
Feeling at ease in my own body	6	1	0	4	10	19	60
Enjoying being touched	8	3	2	6	9	18	54
Disappointment	63	16	5	4	5	2	5
Increased sense of humor	13	5	4	26	20	18	14
Easier than usual to talk with others	2	2	4	5	8	23	56
More comfort in social settings	3	3	3	6	11	18	56
Better able to discuss emotions	10	0	2	9	14	17	48
Easier to express affection	3	0	5	5	8	21	58
Pleasant body sensations	2	3	1	5	5	20	64
Unpleasant body sensations	41	33	14	6	4	0	2

Table 3. Duration of effects autistic adults reported after taking MDMA/ecstasy (N = 100).

Effect	Did not experience %	≤ 1 hr %	≤ 6 hrs %	≤ 1 day %	≤ 1 wk %	≤ 1 mo %	≤ 6 mos %	≤ 1 yr %	> 2 yrs %	Missing n
Increased insight into own thought processes	10.6	2.1	9.6	11.7	21.3	4.3	11.7	6.4	22.3	6
Joy	14.1	5.4	13	31.5	17.4	3.3	5.4	2.2	7.6	8
Feeling more emotions than usual	14	8	11	15	22	10	4	3	13	0
Getting a sense of how others feel	32	2	8	20	9	5	5	6	13	0
Anxiousness	35	11	11	12	19	3	4	0	5	0
Understanding why others feel the way they do	34	3	7	16	9	6	5	6	14	0
Openness	15	1	15	15	16	5	8	8	17	0
Feeling at ease in my own body	22	0	12	17	15	4	9	6	15	0
Enjoying being touched	31	4	26	10	6	3	6	3	11	0
Disappointment	55	3	2	12	12	4	3	1	8	0
Increased sense of humor	43	4	17	11	10	3	3	2	7	0
Easier than usual to talk with others	23	2	10	17	20	7	3	10	8	0
More comfort in social settings	28	0	14	18	11	7	4	6	12	0
Better able to discuss emotions	23	0	10	16	15	2	8	6	20	0
Easier to express affection	26	1	15	14	14	5	6	4	15	0
Pleasant body sensations	34	5	28	12	11	1	2	2	5	0
Unpleasant body sensations	52	5	11	15	11	1	1	1	3	0

be on the autism spectrum (ages 21–49), based on self-report and by meeting a threshold score on a screening measure (AQ). The rationale for selecting the inductive *Applied Thematic Analysis* method was to provide an accurate and rich description of the entire data set, as opposed to identifying a few key themes in support of a predetermined theory or hypothesis. The researcher chose a method that included extensive quoted content in an effort to keep the analysis as true to the participants' voices as possible.

The following sections provide analysis of three qualitative metathemes of clinical relevance: Change, Transformation, and Healing. Table 4 lists the metathemes along with corresponding theme constellations and their subthemes. Pseudonyms were used to identify all of the quoted participants in the following sections, and pronouns were changed in some instances to protect privacy.

MDMA/ecstasy as change catalyst

One of the three foundational, open-ended questions in the qualitative interviews was a prompt to reflect upon any changes that participants observed as a result of taking MDMA/ecstasy in nonclinical settings. Thirteen percent of participants denied notable transient or persisting changes, other than the usual acute effects that they attributed to MDMA/ecstasy at the time of use. However, 87% of participants did report awareness of changes.

All interview participants were asked, "Describe what, if anything, changed for you after your experience(s) with

Table 4. Metathemes, themes, and subthemes of clinical relevance.

Metathemes	Themes	Subthemes
MDMA/Ecstasy as Change Catalyst	Courage	Decreased Barriers
		Reduced Inhibition
		Self-Acceptance
		Increased Sociability
		Increased Openness
	Communication	Talking
		Listening
		Eye Contact
		Body Language
	Connection	Clearer Boundaries
		Greater Intimacy
		Friends
		Family
		Romantic Relationships
		Sexuality
	Communion	Sharing
		General Empathy
		Understanding
		Feeling
	Clarity	Metacognition
		Mental Clarity
		Insight/Epiphany/Revelation
MDMA/Ecstasy as Transformation Catalyst	Peak Experiences	
	Retention	Effect-related
		Utilitarian Memory
		Applied Learning
	"Still the same person"	
MDMA/Ecstasy as Healing Catalyst	MDMA-Assisted Psychotherapy	Couples Therapy
		Touch Exposure
		Music/Movement/Dance Therapy
	Affect and Mood Improvement	Affect Awareness
		Alexithymia
		Improved Mood
		Problem Solving
		Optimism
	Clinical Indications	Trauma/PTSD
		Social Anxiety

MDMA/ecstasy." Some of the responses were about non-specific change. For example, Begrimed responded, "I can tell it changed me in some way." Sylvan, age 24, indicated that their change was of notable magnitude: "I was so changed by that experience." George, also age 24, suggested that his MDMA/ecstasy-related changes were significant when he reported, "I've tried a lot of different other drugs and they affect you in different ways, but this was like sort of total fundamental change."

Meri, another 24-year-old, offered a figurative, before-and-after perspective on his change when he explained, "I considered myself a machine in terms of emotions. I tried very hard not to succumb to any emotions. I felt that it was a stupid, a foolish human trait that I was above. And MDMA changed that." He reported that he valued the expansion of his affective capacities: "It feels nice to be able to change as a person. It was not something that I was expecting very much. Again, for most of my life, I did not change."

MDMA/ecstasy as transformation catalyst

Transformation is the second metatheme. For this analysis, *transformation* was defined as a marked and lasting change for the better. To further distinguish transformative change from other types of change discussed, an assumption was made that the change had a quality that suggested that the experiencer's life was altered in a meaningful and valuable way that was pervasive or permanent.

One transformation-related theme was then-and-now comparisons that suggested a sort of metamorphosis into an evolved version of the old self or identity. Bi0drinx, age 33, reported that the "person I went with noticed the old me is definitely way gone and much more confident and happy." Sylvan, age 24, said, "I'm actually a totally different person since, well… I would say, yeah, since I did it." David, age 39, observed, "Comparing how I was and what I am now, there is a big difference."

Multiple examples of positive transformation were apparent. For example, Jules, age 32, asserted, "It's definitely helpful. It's definitely, my life would be very different if I had not had this experience." Meri compared his former state of affective repression to his freer, transformed self: "For most of my life, I was very consistently depressed, and very much a hateful person. And I'm fairly certain that MDMA made me a very loving person." No participants reported lasting harm or regression to a lesser state or deteriorated

condition as a result of MDMA/ecstasy use. However, this trend may have been due to self-selection bias in favor of positive testimonials and outcomes.

MDMA/ecstasy as healing catalyst

Healing was the third metatheme examined. Bearing in mind that MDMA-assisted change or transformation is not intended to treat or cure autism, the model of a spectrum of wellness can be helpful to conceptualize MDMA's potential as a healing agent in autistic populations. On one end of the clinical spectrum, MDMA had an influence in domains relevant to psychotherapy in general, such as enhancing therapeutic rapport, increasing affect regulation and coping skills, reducing defenses, increasing self-esteem, improving interpersonal skills, enhancing psycho-social well-being, and minimizing resistances to psychotherapeutic processes. On the other end of the spectrum, MDMA-assisted interventions may be effective as treatment for specific indications of serious mental illness, such as PTSD, depression, and types of anxiety that are common in adult autistic populations (Bejerot, Eriksson, and Mörtberg, 2014; Dell'Osso, Dalle Luche, and Carmassi 2015; Vannucchi et al. 2014).

There was consensus among the majority of interview participants that MDMA has potential value as a therapeutic agent. The Mole, age 27, expressed his opinion that:

> *…a lot of people that suffer mentally, you know, with self-image problems, and stuff like that would benefit immensely. Especially people with Asperger's, and you know autism spectrum, and people that have trouble vocalizing.* (The Mole)

Doc Star, age 35, acknowledged that MDMA/ecstasy had a novel anxiety-reducing effect for her:

> *I'm a fairly anxious person, so to have relief from it was kind of a… that was what led to such a powerful experience. So that was one of the reasons why it was so powerful was because it led to that state. I can't really say that there are many other things that have done that ever.* (Doc Star)

Due to the healing from PTSD symptoms that she experienced after MDMA/ecstasy use with supportive partners, Isabeau, age 33, endorsed therapeutic use of MDMA when she said:

> *It was used in the early '80s in couples counseling. So, I think it does make it a little easier to talk, a little easier to empathize with another person's point of view a little, so I think it can definitely enhance communication if used correctly and safely and not every night.* (Isabeau)

Discussion

No participants who contributed data to this study expressed a desire to cure, heal from, or eliminate autism. To the contrary, autism was described in some cases as an intrinsic and valued feature of the self. Some attributes of autism and Asperger's were discussed as disabilities and challenges pertaining to social difficulties. As per the findings summarized under the transformation metatheme, an important subtheme, "Still the Same Person," emerged from participant statements. Although some participants experienced major changes and underwent transformation, no participants reported no longer being autistic after or as a result of taking MDMA/ecstasy.

According to participant interview reports, a common motivation for MDMA/ecstasy use was to diminish what was isolating, confusing, exhausting, and frustrating about navigating neurotypical social norms, which is not the same as wanting to be neurotypical. One interviewee reported that he used MDMA primarily as an aphrodisiac to overcome social inhibitions and hypersensitivities to touch in order to enjoy sexual contact. In the majority of cases, participants reported trying MDMA the first time in their youth without considerable forethought when it was offered to them by others. Intentional, pre-planned use for a specific purpose was less common.

Tony, a 36-year-old male, provided a classic example of a phenomenon that is occasionally reported in which an individual reports experiencing few or no meaningful or even detectable subjective effects. Tony described what it was like for him to have an anomalous response in comparison to his friends: "Well, the thing was there's no *enjoy* in there. Like, the thing of liking it that people have, this happiness of ecstasy, seemed to be just dead air. Like just not getting it at all." Two other participants noticed more effects than Tony did, but they still reported minimal or suboptimal responses, even after repeated attempts at different doses. All three of the lowest responding participants reported that they had consumed MDMA/ecstasy presumed to be of the same dose and purity with others who experienced more typical effects.

In sum, 3 of 24 interviewees (13%) described minimal effects of MDMA/ecstasy. A second subgroup on the spectrum of magnitude of MDMA/ecstasy response levels included eight (33%) moderate responders. They reported a combination of physiological, affective, and cognitive effects, most of which shared characteristics in common with neurotypical accounts and some of which had characteristics that were unique to autistic perspectives. On the farthest end of the response spectrum, 13 (54%) of the interviewees reported optimal effects that they described as life changing in significant and lasting ways. These two subgroups provided accounts of meaningful change in

multiple psychosocial domains, and in some cases, they reported life-changing transformation.

According to Ramsay et al. (2005), individuals on the autism spectrum have anxiety responses to an inability to anticipate or interpret what happens in social situations. This observation was consistent with multiple observations provided during interviews about triggers of social anxiety. Whereas PTSD was an important but not widely reported interview topic, 58% of interview participants made spontaneous references to social anxiety and nearly all participants expressed having some degree of distress related to social interaction. Autistic adults who can speak and whose autism might not be immediately recognizable to others often present in a clinical setting with symptoms of anxiety. Comparative studies suggest that autistic adults, who are faced with strong pressure to conform to non-autistic social norms, are at greater risk for lifetime and current psychological disorders, especially social anxiety (Bejerot, Eriksson, and Mörtberg, 2014; Joshi et al. 2013).

Study limitations

Self-selection bias was an unavoidable limitation for this study. Participants may agree to participate in interviews in hopes of promoting the use of MDMA for autism-related disabilities. This risk was mitigated by encouraging participants to provide accurate descriptions of their experiences and by assuring them that accounts of positive and negative experiences were of equal importance. There was no reliable way to check the veracity of the survey data. However, the online data collection process required that a unique e-mail address was collected for each submission, a step that made completing more than one survey more difficult. Overall, the preference for accuracy in communication that is common in autistic populations was likely to have enhanced the credibility of the accounts provided. Other key limitations, such as selective memory, existed with regard to discussing use of an illicit drug from a retrospective point of view.

The study did not confirm purity, dose, extent of reported or non-reported polydrug use, or concomitant use of other substances, including prescription medications. Descriptions of MDMA/ecstasy use were on varying, unknown doses; therefore, some participants might have reported on subacute dose experiences and others might have reported on effects due to excessive doses.

Despite the researcher's attempts at global, cross-cultural recruitment, 88% of survey participants and 92% of interview participants reported their ethnicity as "White/non-Hispanic." Efforts to recruit female participants by posting announcements to women's autism groups resulted in better than anticipated female participation (76% male, 24% female). However, the researcher was unsuccessful in locating autism organizations or groups specific to particular ethnic groups. Additionally, individuals who did not have access to computers and the Internet would not be able to participate, which could have excluded older persons, less literate persons, and those of lower socioeconomic status.

The study did not confirm an autism diagnosis. The Autism-Spectrum Quotient survey used to determine study eligibility is not diagnostic. Therefore, some eligible respondents might have been excluded and others who do not qualify for an autism clinical diagnosis, but were on the margin, might have been included. Flexibility in favor of inclusion was warranted, considering the evolving definition of autism and the high percentage of adults who did not receive a diagnosis in childhood or adolescence but nevertheless understand themselves to be autistic to a significant degree.

The researcher's primary motivation was investigating the potential of MDMA-assisted therapy as an intervention for mental health issues that are common among autistic adults. As a result, the researcher approached this research with a hypothesis that MDMA may be beneficial. To offset any personal bias, the researcher maintained a personal journal of internal dialog, conscious thoughts, personal assumptions, and opinions, and consulted with mentor researchers and confidantes to discuss emotional responses.

Future research

Research into the clinical potential of MDMA and MDMA-assisted therapies is a burgeoning field. Recent promising findings from MDMA-assisted therapy studies for PTSD (Mithoefer et al. 2018, 2011, 2013) have prompted speculation about other areas of investigation.

One area of research is exploration of optimal treatment models and methods for MDMA-assisted therapy for autistic adults. Methods and design elements from studies with typically developing participants may need to be modified to meet the needs of autistic participants. For example, elements of the setting that are typical for other psychedelic research, such as listening to music on headphones, may be inappropriate for autistic research participants. Research into how to support participants who receive placebo during long experimental sessions, how to conduct pre-session preparation and post-session integration sessions, and how to train clinicians to

work effectively with autistic participants may require innovative treatment and methods guidelines.

A second area of research suggested by the findings is how they might be relevant to populations who experience bullying, social ostracization, and severe discrimination. For example, MDMA-assisted therapy may be helpful to lesbian, gay, bisexual, transgendered, queer, and intersex (LGBTQI) older adolescents and adults going through a difficult coming-out process. LGBTQI and autistic populations are both at elevated risk of suicide, and MDMA-assisted therapy may hold promise for helping them improve quality of life. Non-autistic individuals who present with social anxiety or extreme shyness may also benefit from MDMA-assisted therapies.

A final area concerns longitudinal studies and long-term follow up after experimental treatment with MDMA-assisted therapy. Questions worth asking include: Do participants who receive MDMA-assisted therapy have improved quality of interpersonal relationships over the lifespan compared to the larger autistic population? Are they better able to secure and maintain employment than other adults on the autism spectrum? Are their rates of incarceration or legal problems lower? Are they at greater risk for problematic drug use after study participation? Such longitudinal research would require significant cooperation and data sharing between research teams, planning for long-term engagement with participants, and resources to fund and maintain long-term research.

Conclusion

Study findings may be used to inform larger future clinical studies with adults on the autism spectrum as well as other populations who may benefit from MDMA-assisted therapy that is integrated into a treatment regimen in support of improving social adaptability and comfort in social situations and in interpersonal relationships.

Individual and collective transformation are reciprocal processes. If individuals on the autism spectrum are excluded from full participation in transformative research, then the collective is diminished. Going forward, research teams will benefit from inclusion of adults on the spectrum contributing data as participants, as well as collaborating as members of research teams to refine and customize study design and methods to best meet the needs of the autistic community.

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