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Toward a New Science of Psychedelic Social Psychology: The Effects of MDMA (Ecstasy) on Social Connection

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Abstract

Psychedelic science has generated hundreds of compelling published studies yet with relatively little impact on mainstream psychology. I propose that social psychologists have much to gain by incorporating psychoactive substances into their research programs. Here I use (±)-3,4-methylenedioxymethamphetamine (MDMA) as an example because of its documented ability in experiments and clinical trials to promote bonding, love, and warmth. Social connection is a fundamental human need, yet researchers still possess few tools to effectively and durably boost it. MDMA allows investigators to isolate the psychological mechanisms—as well as brain pathways—underlying felt social connection and thus reveal what should be targeted in future (nondrug) studies. Accordingly, I introduce a conceptual model that presents the proximal psychological mechanisms stimulated by MDMA (lowered fear, increased sociability, more chemistry), as well as its potential long-term impacts (improved relationships, reduced loneliness, stronger therapeutic alliances). Finally, I discuss further questions (e.g., whether using MDMA for enhancing connection can backfire) and promising research areas for building a new science of psychedelic social psychology. In sum, psychopharmacological methods can be a useful approach to illuminate commonly studied social-psychological processes, such as connectedness, prejudice, or self, as well as inform interventions to directly improve people's lives.

Keywords

social connection, MDMA, psychedelics, relationship science, positive psychology, interpersonal relations

> There are a couple of areas in medicine, like hip replacement, where one day you are bedridden, and the next day you're out playing tennis. Or with Lasik surgery, you're blind, and then you can see. Nothing in psychology is like that. But this was dramatic.
>
> —clinical psychologist Mark Wagner, who observed PTSD patients' remarkable recoveries in clinical trials of MDMA-assisted psychotherapy (as quoted by Shroder, 2007, para. 115)

Many social psychologists are probably familiar with the resurgence of research on the therapeutic potential of psychedelic and mood-enhancing drugs such as psilocybin, ayahuasca, and ketamine to treat a variety of psychiatric conditions. The growing field of psychedelic medicine in particular—and psychedelic science more broadly—has reemerged from its dark history and past abuses (for reviews, see Pentney, 2001; Pollan, 2018) to generate hundreds of compelling, credible published studies. However, these studies have yet to be integrated with the subject matter of social psychology. I am here to call attention to what might be lost by neglecting the new psychedelic science. To wit, psychoactive substances have strong potential to inform social-psychological research by illuminating the constructs and processes that the field investigates. This articles focuses in detail on one such construct, perceived social connection, as illuminated by one particular compound—(±)-3,4-methylenedioxymethamphetamine (MDMA)—as an extended case study of what a new science of psychedelic social psychology might look like.

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I propose using MDMA as both an innovative basic science tool and a biointervention that can assist in addressing the fundamental psychosocial need to connect with others. To this end, I (a) describe the psychological importance of social connection and provide a brief overview of work in this area, (b) review the history of MDMA and the laboratory research (with healthy participants) and clinical trials (targeting mental-health conditions) that have already been conducted, (c) propose building a scientific bridge between the basic experimental work and the applied clinical research with MDMA, and (d) offer a new conceptual model of how MDMA can foster bonding and warmth. In establishing a testable model of the effects of MDMA on social connection, I lay out (a) the proposed proximal psychological mechanisms activated by MDMA (e.g., reduced fear and negativity, increased sociability), (b) the conditions necessary for creating lasting impact on social connection beyond the laboratory (e.g., an authentic experience, self-insight), and (c) potential long-term outcomes of MDMA-facilitated interventions (e.g., improved relationships, less loneliness). Finally, I suggest three types of future research directions in this area—testing factors that moderate the effects of MDMA on social connection, testing the underlying psychological mechanisms of this process, and, more broadly, exploring other promising research areas for building a new science of psychedelic social psychology.

Why Study Social Connection?

Social connection, or a felt sense of closeness, intimacy, and belonging with others, is a fundamental human need critical to health and well-being (Baumeister & Leary, 1995; Cacioppo & Cacioppo, 2018; Cacioppo & Patrick, 2009; Maslow, 1943; Ryan & Deci, 2000; Tamir & Hughes, 2018). As Holt-Lunstad and colleagues (2017) argued in their influential article, no other factor likely has as large an impact on quality of life, longevity, and disease outcomes (see also Holt-Lunstad, 2021). Yet evidence suggests that people around the world—especially the young and old—report being lonely a great deal of the time (Barreto et al., 2021; Holt-Lunstad et al., 2017). In other words, even when surrounded by friends, family members, and colleagues, many people still do not feel connected, valued, and heard (Cacioppo & Patrick, 2009; Twenge, 2019). Furthermore, the COVID-19 pandemic, which compelled people all around the globe to reduce their in-person social interactions by as much as 95% (Dezecache et al., 2020; Mervosh et al., 2020; Wilder-Smith & Freedman, 2020), has highlighted even further the importance of scientifically investigating what boosts and maintains a subjective sense of connection in one's daily life.[1]

The most common way that psychologists have examined the experience of connection is within the context of interpersonal relationships. What creates a sense of connection within a relationship? In other words, what makes a close relationship "close"? According to Reis and his colleagues, the answer lies in perceived partner responsiveness—that is, the belief that one is understood, appreciated, and loved by one's partner (for reviews, see Reis & Clark, 2013; Reis et al., 2004). Notably, an individual can be loved but not *feel* she is loved. Numerous studies have shown that such beliefs underlie felt connection and are key to the success of both romantic relationships and friendships (Reis & Clark, 2013).

A great deal of research has explored how to conceptualize, measure, and promote a felt sense of connection within relationships, during social interactions, and in daily life (e.g., Finkel, 2017; Fredrickson, 2013a; Mashek & Aron, 2004; Murthy, 2020; Pawelski & Pawelski, 2018; Vangelisti & Perlman, 2018). Several investigators, for example, have had some success in increasing felt social connection directly by prompting people in randomized experiments to engage in more social interactions (Fritz et al., 2020; Sandstrom & Dunn, 2014) or to act more extraverted (Jacques-Hamilton et al., 2019; Margolis & Lyubomirsky, 2020).

Unfortunately, despite decades of research, psychological scientists still do not fully understand the ontological and neurobiological roots of social connection and possess few tools to effectively and durably boost a subjective sense of social connection in people's daily lives. New approaches and paradigms are needed, and I propose that the compound MDMA—which, as described in detail below, under some circumstances induces in users an intense feeling of love, warmth, and friendship—can serve as a catalyst for shifting research and theory in new directions.

What Is MDMA?

For thousands of years, naturally occurring psychedelic substances have been used in medicinal, spiritual, and ritual contexts. When ingested, psychedelics give rise to profound and altered states of consciousness, including major shifts in perception, cognitive processes, and emotional states (Preller & Vollenweider, 2018). This class of powerful psychoactive substances includes classic psychedelics such as lysergic acid diethylamide (LSD), psilocybin (hallucinogenic mushrooms), and dimethyltryptamine (DMT; found in ayahuasca), as well as related compounds such as mescaline (peyote), ketamine, and the psychostimulant MDMA (for a review, see Nichols, 2016). Today, renewed interest in using psychedelics to treat a number of mental-health conditions has spawned

multiple clinical trials, showing, for example, the therapeutic efficacy of relieving anxiety and alcohol dependence with LSD (Gasser et al., 2014; Krebs & Johansen, 2012); depression with ketamine (McIntyre et al., 2020), psilocybin (Carhart-Harris et al., 2016; Griffiths et al., 2016), and ayahuasca (Palhano-Fontes et al., 2019); and, as described below, posttraumatic stress disorder (PTSD) with MDMA (Jerome et al., 2020; Mitchell et al., 2021).

MDMA—known recreationally as Ecstasy or Molly—is technically a hybrid between a stimulant and a psychedelic (Gouzoulis-Mayfrank et al., 1996) and often labeled an *empathogen* or *entactogen* (Pentney, 2001). However, although it does not produce hallucinations or strong perceptual distortions, many scientists include MDMA within the category of psychedelic drugs. MDMA is the focus of this article because of its recognized ability to promote strong feelings of bonding and connection and its apparent utility as a dyadic tool (Bershad et al., 2016; Earp & Savulescu, 2020; Heifets & Malenka, 2016).

The rise of MDMA as the "love drug," as it is known today (Earp & Savulescu, 2020), began more than half a century ago, when it became available on the street as a recreational drug in the 1970s (Benzenhöfer & Passie, 2010). Psychotherapists quickly recognized the utility of using MDMA for couples counseling and as an adjunct to psychiatric treatment because it facilitated communication, reduced fear in patients, and helped forge a strong patient–therapist bond (Grinspoon & Bakalar, 1986; Holland, 2001; Passie, 2018; Waldman, 2017; Zublin, 2020). Hundreds of clinical case reports at the time documented remarkable and lasting improvements after just one session for conditions such as depression, substance abuse, PTSD, and autism. However, its assumed (yet unverified) dangers and association with all-night dance parties (raves) in the 1980s, under the newly commercialized label Ecstasy, led to MDMA's placement into Schedule I, but not before an estimated hundreds of therapeutic doses had been administered by dozens of psychiatrists and therapists.

Schedule I designates substances with no medicinal use and high potential for abuse. Challenging this designation, research shows that MDMA has a low (but nonzero) potential for abuse (e.g., Mueller et al., 2016; for a review, see Moore et al., 2019). It is not typically used in a compulsive, dependence-inducing pattern characteristic of other stimulants (Degenhardt et al., 2010); 96.5% of users consume MDMA less often than once a month (Feilding, 2019). More science is needed, however, to establish its safety. For example, repeated or high-dose MDMA use has been associated with depressive symptoms and cognitive deficits, and animal studies have demonstrated that high doses of MDMA can lead to neurotoxic effects (for a review, see Meyer, 2013). However, some harms are reversed after a period of abstinence (Selvaraj et al., 2009; see also de Win et al., 2008; Parrott, 2013; Roberts et al., 2018), and MDMA appears to be less harmful and neurotoxic for humans relative to other substances. For example, a detailed analysis in *The Lancet* (Nutt et al., 2010; see also Nutt et al., 2007) broke down drug harms into 16 different criteria. Of the 20 drugs examined, alcohol was the most harmful drug overall, and MDMA, LSD, and psilocybin were in 17th, 18th, and 20th places, respectively.

Clinical Trials With MDMA

Although MDMA's scheduling brought clinicians' efforts to use it in therapy to an abrupt halt, extensive lobbying and planning led by the Multidisciplinary Association of Psychedelic Studies opened the way to clinical trials, which were allowed to begin in 1994, and the ultimate aim was to use MDMA to treat PTSD as part of a multiweek treatment with psychotherapy. Phase II trials with actual patients began in 2004, and Phase III trials began in 2018 (for a detailed account, see Shroder, 2015). In addition, recent and ongoing clinical trials are focusing on MDMA-assisted psychotherapy for autistic adults with social anxiety, for death anxiety among people with terminal illness, for eating disorders, and for alcohol use disorder (e.g., Danforth et al., 2018; De Boer, 2020; Halpern, 2017; Imperial College London, 2019; Sessa et al., 2019; Wolfson, 2015). Notably, the potential of MDMA to alleviate suffering from a variety of ailments came from observations of its ability to induce a sense of connectedness, trust, and warmth; diminish anxiety and defensiveness; and buttress the doctor-patient alliance.

The results of the clinical trials have been impressive. As just one example, in patients with long-term treatment-resistant PTSD, 67% of those who received an active dose of 75 to 125 mg of MDMA no longer met criteria for PTSD at the 12-month follow-up or later (Jerome et al., 2020; see also M. Mithoefer, 2013; M. C. Mithoefer et al., 2010; see Phase III replication in Mitchell et al., 2021). Furthermore, 97.6% of patients reported experiencing benefits, and only 8.4% reported experiencing harms (e.g., worsened mood).

In sum, psychedelic medicine is becoming a scientifically credible, growing field with immense potential for mental-health treatment. However, ensuring the safety of patients and participants—present and future—is of the utmost importance and, for this reason, work in this area remains appropriately tightly regulated and closely scrutinized. Marrying safety and innovation, recently established centers for psychedelic research at Johns Hopkins University and Imperial College London herald a new era of openness toward studying psychoactive drugs as catalysts for alleviating suffering.

Laboratory Research With MDMA

Initial trials with MDMA and other substances to treat psychiatric disorders have yielded highly promising results. However, because of the patient-guided, multicomponent, and multisession nature of MDMA-assisted psychotherapy, the mechanisms of action behind its utility in alleviating PTSD and other mental-health conditions remain unclear. Fortunately, numerous studies with humans and rodents in psychopharmacology laboratories across the United States and Europe have begun to unpack both the neurobiological and psychological processes affected by MDMA. To advance understanding of the key mechanisms underlying boosts in social connection, it is important to investigate how MDMA affects the user's emotions, thoughts, and behaviors—as well as the neural pathways—while under the drug's acute influence.

Although outside the scope of this article, evidence concerning the mechanisms of action of MDMA in the brain suggests that this psychoactive substance can serve as a novel and powerful tool for uncovering the neural pathways underlying feeling understood, valued, and loved, thus illuminating the neurobiology of social connection (Heifets & Malenka, 2016, 2021). In broad terms, MDMA has been shown to increase levels of serotonin and oxytocin—neurochemicals related to well-being and social bonding under some conditions—and to decrease activity in the amygdala, a region of the brain involved in processing memory, emotion, and threat. However, MDMA is a neuromodulator that influences multiple neural systems, so its key neurobiological mechanisms are likely highly complex and remain unexplained (see Liechti, 2015; Meyer, 2013).

More relevant to what social psychologists might find of value in research on the acute (or on-the-drug; ≥ 5-hr) effects of MDMA are its observed effects on thoughts, feelings, and behavior associated with social connection. Research in human behavioral pharmacology (or psychopharmacology) involves conducting experiments with randomized, placebo-controlled, and blinded drug administration. Data from these laboratory studies indicate that MDMA influences social feelings (e.g., feeling more friendly and self-confident), social information processing (e.g., diminished threat perception), and social behavior (e.g., more prosociality) in humans (for reviews, see Bershad et al., 2016; Jungaberle et al., 2018; Kamilar-Britt & Bedi, 2015).[2] These acute social-emotional effects (see below) shed light not only on what factors underlie MDMA's therapeutic efficacy revealed in the clinical trials but also on how it may be used to unpack—and potentially promote—feelings of being understood, accepted, and cared for by partners, family members, and friends, not to mention therapists. I describe these studies in more detail below and address the potential dangers of pharmacologically boosting a subjective sense of connectedness.

Several caveats and observations about this research are worth noting. The biggest concern is that double-blind experiments are very challenging to conduct with powerful psychoactive drugs.[3] As a result, it is difficult to separate the pharmacological effects of a drug on participants' behaviors and self-reports from their expectations and prior beliefs. Researchers have addressed this issue with several approaches. First, participants' expectancies and experimenter effects can be minimized by providing little information about the identity of the drugs and by using placebo controls (i.e., double-blind procedures). Second, the effects of MDMA can be compared with the effects of other psychostimulant drugs, such as methamphetamine ("meth"), *d*-amphetamine and *l*-amphetamine (Adderall), or methylphenidate (Ritalin; for a review, see Bershad et al., 2016). Studies show that the effects of MDMA differ from these other stimulants on social variables. Third, in many experiments, the results are dose-dependent; higher doses of MDMA produce stronger effects than lower doses. When feasible, future human studies should attempt to control expectations by varying instructions and using comparable doses of another psychoactive drug or a lower (but still active) dose of the same drug.

A second issue is less methodological and more substantive but no less important. Nearly all of the studies mentioned above—including those finding loving, friendly, sociable feelings after ingesting MDMA versus control pills—have been found with participants sitting alone in a testing room while completing measures or responding to stimuli and with only occasional, minimal arms-length interaction with an experimenter (for an exception, see Kirkpatrick & de Wit, 2015). Such isolated testing conditions represent a fundamentally different experience than interacting with a real person and especially with persons one knows well. As discussed in more detail below, MDMA is arguably unique in that, relative to other psychoactive substances, its effects on feelings of connection are amplified in the presence of others—whether in nascent or in established relationships (e.g., Bershad et al., 2016; Kirkpatrick & de Wit, 2015; however, for parallels with alcohol, see Sayette et al., 2012).

A Bridge Between Basic and Applied Aims

To be sure, a number of investigators are administering MDMA in the presence of others—to wit, this is taking

place in clinical trials testing the efficacy of MDMA-assisted psychotherapy. Indeed, the presence of other people during an MDMA session is one of the key divergences between the "basic" laboratory work to date and the "applied" clinical research. In this article, I propose that future research in psychedelic social psychology can serve to build a bridge between the two existing lines of MDMA research relevant to social connection by triangulating the strengths and limitations of each approach. I envision this future work sharing both basic and applied goals. Here is how.

Basic aims

When scientists wish to study a phenomenon, they try to observe it naturalistically or induce and measure it in the lab. Some phenomena, however, are difficult to capture. A person arguably does not often feel genuinely understood and cared for by others, and this sense of deep connection is not easy to manipulate. Yet MDMA may give researchers opportunities to "bottle" such experiences and examine them up close. Accordingly, incorporating MDMA in a research program makes it possible for an investigator to manipulate and isolate the psychological mechanisms—as well as brain pathways—underlying the feeling of being truly connected, loved, appreciated, and understood (see Inagaki, 2018; Morelli et al., 2014) and, at the broadest level, illuminate the relationship between the brain and the mind itself. Whether such feelings are authentic and comparable to "real-life" connection is also a critical empirical question (see more below). Furthermore, studying the mechanisms of action that promote a sense of connection under the acute effects of MDMA may reveal what psychological "active ingredients" underlying connection should be targeted in future (nondrug) experimental studies. For example, if those active ingredients are found to be higher empathy, incremental self-disclosure, reduced anxiety, smile synchrony, and more prolonged eye contact, then the effects of each of those factors—alone and in combination—could be assessed next.

Applied aims

As described above, MDMA can be used in research purely as a tool to better understand the phenomenon under study (e.g., social connection). A rather different aim—one that is more clinical or applied—is to consider how MDMA can directly improve people's daily lives. If two to three doses under clinical supervision and monitoring can heal up to two thirds of people who have suffered with PTSD for decades (Jerome et al., 2020), then a similar dosing regimen, perhaps with occasional boosters, might foster social connection in both healthy people and those with social challenges, thereby alleviating loneliness, strengthening relationships, and improving their social lives as a whole. To be sure, this goal would not be attained until a great deal more rigorous, systematic experiments and safety studies are conducted and MDMA is removed from Schedule I, which is expected by the end of 2023 (Doblin, 2020).

Bridge between basic and applied

Is it possible to use MDMA both as a research tool and as an intervention to actually improve people's social lives? One challenge is the disconnect that currently exists between the clinical and laboratory research. Researchers and trialists in the field of psychedelic medicine care a great deal about the optimal "set and setting" (Hartogsohn, 2017), as well as about the importance of integration before and after administering MDMA. Reflecting a long tradition of theory on the importance of appraisal and mindset (e.g., Dweck, 2008; Ellsworth, 2013; Lazarus, 1991; Zion & Crum, 2018), an individual's experience is thought to vary substantially depending on their intention for taking the drug; on where, how, and with whom they take the drug; and on how they process that experience both acutely and in the aftermath of the direct drug effect. Furthermore, MDMA-assisted psychotherapy, where the integration takes place, involves multiple sessions over the course of several weeks or months and dozens of hours of total therapy. In stark contrast, the experimental studies in human psychopharmacology labs strive to follow the widely held principles of randomized placebo-controlled paradigms, including being double-blind, such that the participant ideally has no specific expectations about the substance they are taking and no expectations or "demand" communicated by the experimenter. Although this ideal aim is not always achievable (e.g., often participants are told in advance about potential drug effects), laboratory researchers try to deliberately remove individually tailored set, setting, and integration from their study designs and may thus change the drug's basic effect as a result.

Each approach has its benefits and drawbacks, but a research program that builds on the strengths of both the clinical trials and the laboratory research holds great potential in advancing knowledge about how to promote social connection and increase well-being, as well as in elucidating numerous other constructs of interest to social psychologists. Indeed, I believe this is the exact type of hybrid approach that is a strength of social-psychological science. As just one example, whereas the experimental laboratory studies to date have tested

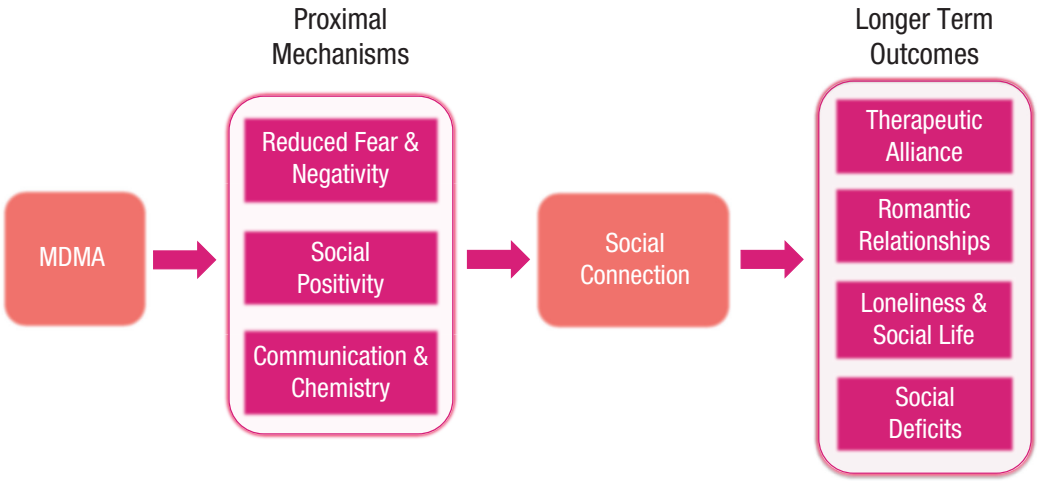

Fig. 1. Effects of MDMA on social connection. Shown at left are the psychological active ingredients—that is, the proximal psychological and behavioral mechanisms while under the acute influence of drug—underlying the effects of MDMA on social connection. At far right are the longer term outcomes of MDMA on relationships, social life, and mental health.

the effects of MDMA on specific aspects of social behavior that are presumed to contribute to or benefit relationships (e.g., responses to rejection [Frye et al., 2014], pleasure of social touch [Bershad et al., 2019], and use of positive words [Wardle & de Wit, 2014])—albeit found in the absence of an interaction partner—future studies should aim to test whether MDMA affects relationships themselves. Future investigators could study the effects of MDMA on feelings of connection during an actual social interaction (with a novel partner or a familiar one), on how one perceives one's social life in general, and on the quality of one's relationships weeks or months after drug administration. Notably, these three variables do not always correlate (see Cacioppo & Cacioppo, 2018; Collier & Hughes, 2020), and MDMA research could illuminate the conditions under which, say, a global sense of connection does not co-occur with connection felt during specific interactions. Furthermore, on-the-drug effects (e.g., greater feelings of lovingness or empathy) could be tested as mediators of the long-term outcomes (e.g., a global sense of belonging or improved friendships). Notably, this is the inverse of the approach taken by many psychological scientists, who typically first establish an association between variables and subsequently hunt for the mechanisms that underlie it.

To my knowledge, only one clinical trial with MDMA is being conducted in the context of a relationship (MDMA-assisted psychotherapy with couples, one of whom has PTSD; Monson et al., 2020). Hence, rigorous experimental studies with dyads or couples can fill a major gap in research by identifying the mechanisms of action behind the utility of MDMA in alleviating PTSD and other mental-health conditions (such as strengthening the therapeutic alliance), improving romantic relationships, and reducing loneliness. In the next section, I present a model that illustrates the pathways and variables that are ripe for study in future work.

A Model of the Effects of MDMA on Connection

The model illustrated in Figure 1 has two parts: The first part (left) represents the proximal mechanisms underlying social connection, or the effects of MDMA while under the acute influence of the drug, whereas the second part (far right) represents the effects of ingesting MDMA on outcomes observed days, weeks, and months later.

To begin, the proximal psychological mechanisms represent the key active ingredients catalyzed or boosted by MDMA, as suggested by randomized laboratory experiments and clinical trials as well as by anecdotal evidence from participants, patients, and recreational users. They can be further subdivided into three loose overlapping categories: lowered fear and reduced negativity, increased social positivity, and improved communication and chemistry. Below I call attention to potential overlaps between some of these variables and how future investigations might differentiate between them. Although some of the variables encompassed by these three categories (e.g., perceived intimacy) seemingly overlap with the global construct of connection at the heart of the model, I define the proximal

mechanisms as variables assessed in the moment while on the drug. These variables are hypothesized to foster a subsequent global sense of connection, as well as its correlates and consequences, after the drug wears off.

Finally, although beyond the scope of this article, the proximal mechanisms could be further subdivided into multiple pathways—namely, emotional (e.g., reduced fear, increased lovingness), cognitive (e.g., reduced detection of threat), behavioral (e.g., increased eye contact and self-disclosure), neurobiological (e.g., downregulation of amygdala), and neurochemical (decreased serotonin uptake).

Proximal mechanisms

Reduced fear and negativity. MDMA has been shown to broadly reduce negative thoughts and emotions, which can serve as barriers to communication, intimacy, and warmth with others, whether those others are lifelong partners or new acquaintances. Multiple randomized controlled experiments have found that 1 or 2 hr after the administration of MDMA—at peak drug effect—participants report lower social anxiety (e.g., Baggott et al., 2016); reduced detection of angry, disgusted, sad, and fearful faces (presumably mitigating the emotional punch of threatening facial expressions; e.g., Hysek et al., 2014); and decreased intensity of feeling rejected after social exclusion (e.g., Frye et al., 2014; see also Bedi et al., 2009). Reductions in anxiety, fear, and defensiveness have also been reported in clinical trials and surveys of recreational users (e.g., Danforth et al., 2016; Greer & Tolbert, 1986; Jerome et al., 2020).

These findings are consistent with the idea that MDMA removes "barriers" to communication and takes down "walls" that people erect around themselves. When individuals are less fearful and defensive, they are better able to reflect on, discuss, and confront topics that might otherwise be painful or uncomfortable. Work examining human brain changes during the acute effects of MDMA, as well as work with animal models, supports the notion that MDMA facilitates emotional memory processing and enhances fear extinction (e.g., Carhart-Harris et al., 2015; Feduccia & Mithoefer, 2018).

These findings highlight one possible explanation for why MDMA is an excellent candidate for treating PTSD: With the help of the drug, an individual gains the ability to engage difficult feelings and memories about their trauma in a relatively unreactive way, such that they are able to reexperience it with some perspective but without panicking—that is, retaining the memory but tempering or reinterpreting the anxiety. That MDMA can reduce negativity and recast the experience of social anxiety and threat also highlights why it may be an excellent candidate for building connection: Under the drug's acute effects, an individual is relatively less likely to interpret verbal and nonverbal behavior from an interaction partner as signals that the partner dislikes them, that they are bored or hostile, or that they are judging them.

Social positivity. Dozens of laboratory experiments have shown that, relative to a placebo, another stimulant drug, or a lower dose, MDMA increases or promotes a set of related constructs that I refer to as "social positivity." Most important, it increases positive affect overall, along with feelings of being connected, as typically measured with single-item visual analogue scales—namely, feeling loving, friendly, amicable, sociable, talkative, gregarious, and extraverted (e.g., Bedi et al., 2010; Gamma et al., 2000; Hysek et al., 2011, 2014; Kirkpatrick & de Wit, 2015; Tancer & Johanson, 2007; van Wel et al., 2012). A multilevel meta-analysis of 58 effect sizes from 32 studies (N = 792) revealed a medium-to-large average effect (r = .40; d = 0.86) of MDMA on self-report ratings of social positivity (Regan et al., 2021; for qualitative reviews, see Bershad et al., 2016; Kamilar-Britt & Bedi, 2015).

Relatedly, MDMA has also been found to increase trust (e.g., Schmid et al., 2014), empathy (e.g., Hysek et al., 2014; Kuypers et al., 2014), self-confidence (e.g., Harris et al., 2002), self-compassion (which is higher in MDMA users; Kamboj et al., 2015), and a desire to interact (Kirkpatrick et al., 2014). Accordingly, MDMA has been described as enabling people to receive both compliments and critiques with greater acceptance (Greer, 1985). Furthermore, after ingesting MDMA, people are more generous (Hysek et al., 2014; Kirkpatrick et al., 2015; Stewart et al., 2014), more responsive to friendly faces (Wardle & de Wit, 2014), and judge others as more attractive (Kirkpatrick & de Wit, 2015).

These findings illuminate how MDMA might serve to create connecting moments, enhance social interactions, and strengthen relationships. An individual who feels friendly and sociable, who trusts, gets, and likes other people, and who seeks to approach them is relatively more likely to engage socially with others. One who is self-confident and self-compassionate is also relatively more likely to take a social risk, such as greeting a stranger, having a deep rather than shallow conversation, or making amends by repairing a falling-out (e.g., Breines & Chen, 2012). Finally, positive, kind, and extraverted people are better liked by others (for a review, see Lyubomirsky et al., 2005). Accordingly, MDMA appears to create the conditions that make it easier for individuals to connect.

Communication and chemistry. This category comprises a number of features that are critical to successful social interactions and that facilitate interpersonal

chemistry. These include honesty and self-disclosure (e.g., Tamir & Mitchell, 2012), openness to others, perceived intimacy (Mashek & Aron, 2004), behavioral synchrony (e.g., Sharon-David et al., 2018), eye contact, physical touch, and a sense of complete absorption in the moment (Csikszentmihalyi, 1990; for a review of these constructs, see Reis et al., 2022). A few studies have examined these variables experimentally; for example, MDMA has been found to boost openness (e.g., using the NEO scale; Costa & McCrae, 1992; Wagner et al., 2017; see also Schmid et al., 2014), self-disclosure (e.g., self-reported comfort in self-disclosing, as well as more actual words about family and emotions; Baggott et al., 2016; see also Siegel, 1986), and the pleasure of actual physical touch (Bershad et al., 2019). The other features of communication—for example, prolonged eye contact, flow, and feeling in sync—are supported by surveys and extensive anecdotal evidence. For example, people report that MDMA makes it easier to "click" with others and "soak in the now" (Jennings & Obenhaus, 2004; O'Brien, 2020). More research is needed to corroborate, expand on, and replicate both of these experimental and survey results as well as to identify the variables that show the strongest acute effects with MDMA versus those that are not separable and should thus be combined (e.g., feeling "open" to others vs. desire to interact with others).

These proximal mechanisms underlie partner responsiveness. A review of the psychological active ingredients found to be catalyzed by MDMA spotlights why a deep sense of connection with one or more others—a feeling of being truly loved and understood—is made possible by this drug. As noted above, a relationship characterized by partner responsiveness is one in which the individual feels deeply understood (and not judged), valued, and cared for (or loved) and whose partner feels the same. Perceived partner responsiveness depends on each partner engaging in three types of behavior (Reis & Clark, 2013). The first is self-disclosure, or making oneself vulnerable with the other by opening up about one's sincerely held values, dreams, and goals. The second involves being behaviorally attentive and authentically interested in the other. And the third is expressing care and appreciation for the other. To my knowledge, very few studies have directly measured the experimental effects of MDMA on these constructs, but the body of empirical and clinical evidence to date suggests that MDMA is a prime candidate for bolstering partner responsiveness in both the participant (who ingests MDMA during a study) and their interaction or relationship partner (who does not). Indeed, MDMA users and study participants report heightened interest in others (Harris et al., 2002) and experiencing a feeling of being cared for and loved (Peroutka et al., 1988)—describing, for example, an "intimacy and connection beyond what [they] have in normal daily life" (Jennings & Obenhaus, 2004, 23:45).

At present, social-psychological and relationship science leaves many questions unanswered about how to foster the three facets of partner responsiveness. Which facets are most critical to improving relationships, health, and well-being, and which are necessary, sufficient, or both? And does the impact of these three facets depend on the nature of the relationship (e.g., close vs. distant, new vs. long-term) or the characteristics of each partner (e.g., their personality or attachment style)? Furthermore, what specific behaviors should individuals engage in if they, say, desire to show authentic interest on a first date? I hope to persuade researchers that MDMA is a promising tool for addressing these questions. For example, in a series of dyadic experiments, if the (sober) partners of participants on MDMA report feeling deeply and authentically understood, investigators can carefully assess the specific behaviors shown by the participants during the study session and try to isolate which behaviors are associated with this feeling. Further, if the participants on MDMA report that their partners are responsive, investigators can test whether this belief is associated with changes in their partners' actual behavior (or not). In these ways, such research may advance knowledge of how to enhance and build social connection in people's daily lives.

Critical conditions for enduring impact beyond the lab

For MDMA to influence actual relationships beyond the laboratory, its impact must be enduring. Given that long-term effects of any laboratory paradigm are rare, I propose that certain conditions must be met for an individual's experience on the drug to translate into daily life. These conditions are authenticity, insight, and transformation.

Authenticity. Participants administered MDMA in randomized controlled studies report that the experience felt authentic (e.g., not putting on a "false face," being in touch with their deepest feelings, and acting in a way that expresses their values; Baggott et al., 2016). A noteworthy property of MDMA, compared with other powerful psychoactive substances, is that even when it prompts individuals to behave or feel differently from their usual selves—for example, as more loving, more trusting, more open, or more empathetic—they still feel like themselves. One possibility is that if MDMA takes down barriers and walls, then the user might feel even more like their "true self" while on the drug. However, for this to happen, reflection on the experience—by oneself or with a trusted

associate or trained professional—may be necessary for some individuals or under some conditions (e.g., when one's behavior was highly unexpected). Other people, however, carry a risk that expressing their true self means showing a dark side of themselves or practicing radical honesty, which could cause pain to others.

Notably, the observation that MDMA forges an authentic experience—as opposed to a false feeling ungrounded in real social interactions—has significant implications for its capacity to translate from the laboratory to normal life. Indeed, without authenticity, the individual is unlikely to feel validated and understood because one cannot feel validated if they hide their true self.

Insight. After ingesting MDMA during psychotherapy, people also describe attaining greater insight into themselves. For example, 89.2% of clinical trial participants reported increased self-awareness and self-understanding a year later (Jerome et al., 2020). Are these insights "real" for having surfaced while under the acute influence of a strong psychoactive drug? The metaphor of MDMA as a magnifying glass is illuminating. A magnifying glass alters what one sees, but it also allows the viewer to see even more—to make out things that are not accessible to their normal vision and would otherwise be hidden from their sight. What a person glimpses through a magnifying glass is no less real for being refracted through a lens (Earp & Savulescu, 2020). Furthermore, when on psychedelic-like substances such as MDMA, people often report experiencing thoughts that are unusually concrete, evocative, and memorable; as such, those thoughts may exert a particularly strong impact on behavior (Pollan, 2018). In these ways, MDMA may reveal insights into oneself that are not available in normal life.

Transformation. Last but not least, it is critical to test whether the effects of MDMA on social connection endure after the drug wears off. I propose that MDMA—unlike drugs such as heroin or cocaine or soma in Aldous Huxley's (1932) *Brave New World*—inspires people to connect to others in their normal daily lives in a similar way that they were able to connect while on the drug. This transference of experience outside the laboratory is made possible in part due to the first two conditions described above. First, MDMA prompts individuals to feel that they are behaving like their true, authentic selves. Second, the MDMA experience appears to produce insights and shifts in perspective that have a weightiness and veracity to them, making the insights more likely to be carried forward.

For all of these reasons, using MDMA can feel transformative. Indeed, a recurring theme among people who try MDMA for the first time is that it changed their lives (Jennings & Obenhaus, 2004; for more examples, see Earp & Savulescu, 2020; Zublin, 2020). These observations should increase researchers' confidence that the effects of MDMA demonstrated in the lab—even when they do not actually change participants' lives— can be durable, past the day of drug administration, and generalizable to real-world settings and social interactions. To be sure, the potential harms of MDMA could be durable as well; hence, researchers should proceed cautiously while investing in the frameworks and safeguards necessary to ensure that it can be used safely in study participants. Finally, it is worth emphasizing that the longevity of MDMA's effects is also contingent on the ecology into which the participant returns. No matter how transformative the insights or how deeply felt the sense of connection, if one's partners, friends, and family members do not respond warmly and constructively, long-term impacts will be unlikely.

Longer term outcomes

If MDMA has the potential to produce enduring positive effects outside the laboratory or clinic, then the implications for lasting impact are exciting. Now that I have sketched out the conditions essential for such impact, I turn to describing some of these longer term outcomes in more detail. In Figure 1 (see far right), I have chosen to highlight four broad categories of such outcomes while opting to omit other likely or obvious outcomes (e.g., psychological well-being, physical health, personality traits, self-esteem) that are somewhat less relevant to social connection and beyond the scope of this discussion.

Therapeutic and other professional alliances. An open, trusting bond between clinician and patient is foundational to the success of mental-health treatment (Safran & Muran, 1998). The evidence to date suggests that MDMA is uniquely positioned to forge this critical connection. As Pollan wrote in his 2018 bestseller *How to Change Your Mind*, "[Psychedelic] guides told me MDMA . . . condenses years of psychotherapy into an afternoon" (p. 237). MDMA is thought to build and nurture the therapeutic alliance because it leads the patient to engage in open and honest communication and to feel more connected, less judged, less defensive, more trusting, more attentive, and more empathetic toward the therapist (Heifets & Malenka, 2016). Notably, the same processes may underlie the potential of MDMA to bolster trust and rapport in other types of professional relationships, such as those forged during negotiations and conflict management, as well as those between doctor and patient, manager and employee, and teacher and student. Future studies could unpack these mechanisms to determine

which are necessary and/or sufficient in creating and maintaining these bonds.

Romantic relationships. The therapist-client bond is an important one, but MDMA has the potential to affect other close relationships in people's lives, such as romantic and intimate relationships. On the basis of clinical evidence with couples and the experimental work described above, I suggest that MDMA can be brought to bear to build or improve romantic ties for all the reasons outlined above—because it increases positivity, trust, empathy, intimacy, and warmth; because it reduces defensiveness; and because it enhances communication, members of a couple view each other with greater generosity and love. Furthermore, when relationship conflicts arise, MDMA is likely to enhance a couples' ability to discuss potentially painful or divisive issues with honesty and empathy without triggering defensiveness, anxiety, or anger. It is worth noting, however, that for similar reasons the use of MDMA—whether in the context of couples counseling or not—could also help couples decide to end the relationship and to accept that decision. Future research is needed to test these predictions in controlled experimental settings.

Loneliness and social life. In light of MDMA's ability to promote bonding, foster connection, and reduce fear, future research would also do well to explore how it may be used not only to illuminate the neurobiological and neurochemical roots of loneliness but also to help alleviate loneliness and improve people's social lives. The United States and other countries are reportedly suffering from epidemics of loneliness (Holt-Lunstad et al., 2017), and this problem appears to be particularly acute among Generation Z, whose around-the-clock screen use is correlated with fewer face-to-face interactions, as well as with increased anxiety and depression (e.g., Barreto et al., 2021; Nowland et al., 2018; Twenge, 2019; Twenge et al., 2018). Although the jury is still out on whether and why loneliness and mental-health problems are increasing among youth (e.g., see Odgers & Jensen, 2020; Orben & Przybylski, 2019), a number of scholars believe that digital media are eroding social connection among individuals of all ages, who are paying more attention today to mobile devices than to other humans (Alter, 2018; Nowland et al., 2018; Turkle, 2012). Paradoxically, increased digital connectivity may be making people feel more separate from one another in real life (Sbarra et al., 2019).

Another population likely to benefit from MDMA are the old and "old old," whose numbers are increasing globally (United Nations, 2019). Older people ironically care more about social connection (Carstensen et al., 1999; Theeke, 2009) but report being relatively more lonely than younger people (Hawkley & Capitanio, 2015). The benefits observed for physically healthy older people for whom MDMA can be administered safely (i.e., those without cardiovascular contraindications; Greer & Tolbert, 1998) may finally lend support to Pollan's (2018) oft-cited speculation that psychedelic-type drugs "might be wasted on the young."

Finally, the pool of individuals who seek to increase or deepen their connections, make more friends, find relationship partners, and become more sociable is large (Hudson & Fraley, 2016; Cigna, 2018; Reisz et al., 2013). Many of them are healthy and well functioning, whereas others may be characterized by anxious or avoidant attachment styles, extreme shyness, or lack of social skills (for examples and evidence among youths, see Julian, 2018; Twenge, 2017). By boosting a global sense of connection and belonging—as well as increasing liking for and desire to approach others—MDMA can potentially enhance the social lives of all those striving to flourish.

Social deficits associated with mental health. Most mental-health conditions are arguably attendant by a range of social deficits. I propose that MDMA can be valuable in mitigating the social obstacles or problems endured by individuals with a variety of conditions, including social anxiety, panic, depression, autism, substance abuse, and even schizophrenia. These conditions make healthy social interactions—and particularly interactions distinguished by partner responsiveness—difficult or even impossible, thus preventing some individuals from having few if any truly positive social experiences. If, after using MDMA, a person can feel a deep sense of connection, forge a new relationship, or repair an existing one, the benefits may be truly consequential and enduring.

MDMA and Social Connection: Future Directions and Further Questions About Mechanisms

Are the effects of MDMA on social connection unique?

Despite its promise, many conceptual, empirical, and methodological questions about the proximal and distal effects of MDMA (see Fig. 1) remain unanswered or only partially answered. One challenge is to identify what is unique about MDMA—in other words, how to differentiate its effects on connection and related constructs from those of other psychoactive substances such as methamphetamine, *d*-amphetamine, methylphenidate, and cocaine. For example, classic psychedelics such as psilocybin and 5-MeO-DMT are also known to boost a sense of connection and oneness, albeit not necessarily with a particular individual or group but

with all living things (e.g., Griffiths et al., 2008; Uthaug et al., 2019), and alcohol has been shown to promote social bonding (e.g., Sayette et al., 2012).

Possibilities include that other drugs promote different types of connection (e.g., connection with all organisms) or that they also promote social connection (e.g., to a new acquaintance or close other) but via different psychological mechanisms (e.g., via increased sociability and energy vs. decreased social anxiety vs. increased self-disclosure vs. increased synchrony). Existing evidence from randomized experiments comparing MDMA with other psychostimulants suggests that MDMA may be unique in its effects on subjective feelings of closeness, trust, and openness (Schmid et al., 2014; but see Kirkpatrick et al., 2012), as well as on empathy, reciprocity, and resource allocation (Bershad et al., 2016; Heifets & Malenka, 2016). However, the discovery of oxytocin's role as a mechanism of action underlying MDMA's effects suggests that MDMA may promote relatively more connection to in-group than out-group members (De Dreu, 2012).

In sum, more such studies could help unpack both the psychological and neural mechanisms unique to MDMA and to the social-psychological constructs it appears to target (e.g., belongingness or loneliness). For example, whereas other psychoactive substances may increase general positivity (e.g., confidence and positive affect), MDMA may uniquely affect *social* positivity (e.g., feeling sociable and loving). Last but not least, it would be valuable to determine in what ways MDMA's effects—and the mechanisms underlying them—differ from those of purely psychosocial interventions, such as social-skills training (e.g., Beidel et al., 2014) or prosocial behavior interventions (e.g., Revord et al., 2018). Is the social connection produced after ingesting MDMA phenomenologically and neurobiologically comparable to the social connection generated by powerful (nonpharmacologic) social manipulations? Finally, what mechanisms or tools can be learned from MDMA research that scientists and practitioners can subsequently apply in nonpharmacologic interventions?

Does MDMA have enduring effects and, if so, via what mechanisms of action?

As discussed earlier, MDMA may be unique in its ability to produce durable effects on social connection and other outcomes—that is, effects that last after the drug wears off. The large majority of laboratory studies with MDMA involve within- subjects analyses, and critical comparisons between participants' responses to drug versus control are made at the time of peak drug effect. Future studies with between-subject designs—which allow for follow-ups—are needed to answer the many questions that remain about whether the impact of MDMA is truly durable and can inform long-term interventions, as well as about the critical mechanisms underlying its durability.

As illustrated in Figure 1, the on-the-drug (proximal) effects (e.g., reduced defensiveness, greater synchrony) can be revealed in future studies as mediators of the long-term outcomes. However, there are several possibilities for how the mediational pathways may play out. For example, after consuming MDMA during a session with a novel study partner, the participant may experience a deep sense of connection, understanding, and chemistry, which leads them to commence a friendship with that partner. This experience might simply forge an openness to connect or confidence that they have the capacity to connect in general—to other potential partners—such that, during future social settings, they do not need MDMA to continue the conversation or to initiate a conversation with another stranger. Put into colloquial language, after the walls come down, it may be easier to keep them down or bring them down again the next time.

Another possibility is that the positive social MDMA experience with a study partner may simply lead people to value feeling connected more (perhaps because they now recognize or remember how rewarding that feeling is) and thus alter their social behavior to seek out connection more in the future (e.g., Miller et al., 2017). Alternatively, connection actually becomes more rewarding, triggering more positive emotion, but the person's social behavior remains the same. In sum, future investigators could test whether MDMA (a) increases the desire to connect at future time points, (b) produces changes in actual social behavior while connecting with others, and/or (c) leads to a more rewarding subjective experience while connecting (see Tamir & Hughes, 2018). Furthermore, these mechanisms could underlie what creates connection during the drug session or what produces the long-term effects of using MDMA, or both. Finally, these ideas imply that MDMA is simply the initial trigger of downstream psychological changes—a model for advancing researchers' understanding of what produces connection and its by-products. Alternative nonpharmacologic triggers could presumably be discovered in the future.

Notably, all of these possibilities essentially involve hypothesizing a second set of intermediary mechanisms in the model—for example, MDMA promotes social positivity, which boosts confidence in social interactions, which promotes social connection. Or, MDMA prompts less defensiveness and reactivity to fear, which disinhibits social and prosocial behavior, which promotes social connection. However, a divergent perspective is also

worth noting: Under some conditions, MDMA may have a direct effect on a particular long-term outcome without any necessary mediation. For example, using MDMA in a single laboratory session may diminish loneliness directly, perhaps via a state effect during the session that triggers changes in the brain (for corroborating evidence of the direct effects of MDMA on social outcomes in mice, who presumably do not make meaning of their MDMA experience, see Nardou et al., 2019).

MDMA and Social Connection: Future Directions and Further Questions About Moderating Factors

Should MDMA be the new aspirin or Prozac?

In light of the multiple allegedly beneficial and even transformative effects of MDMA, one might wonder whether this is a happy wonder drug—a medicine that should be consumed as often as the need arises. The answer is an emphatic no. Results from the Phase II clinical trials (Jerome et al., 2020; M. C. Mithoefer et al., 2010, 2018) suggest that as few as one, two, or three doses administered over several weeks or months can have powerful and durable effects. Anecdotal testaments are consistent with this finding—for example, "People spent twenty years meditating in order to feel the way MDMA made you feel in an afternoon" (Brother David Steindl-Rast, as quoted by Shroder, 2015, p. 175). Indeed, researchers during the 1970s investigating the effects of MDMA after a single session reached the conclusion that "once you got the message, you could hang up the phone" (Tolentino, 2019).

Future investigators could test whether a single dose—potentially with infrequent boosters—could bring long-term benefits for social connection. However, despite MDMA's purported low potential for addiction and low likelihood of harms to self and others, more safety studies are needed on the adverse effects of even low frequency use.

Is MDMA a social catalyst and, if so, what are the moderating relationship factors?

If MDMA stimulates social connection—including feeling truly understood, appreciated, and loved by another person—is the presence of that other person necessary for the drug to manifest itself and for positive outcomes to emerge (for evidence for the social-catalyst hypothesis in mice, see Nardou et al., 2019)? As discussed above, nearly all human psychopharmacology studies measure participants' responses to hypothetical or socially distant strangers with whom they will never interact again. MDMA is expected to be relatively more likely to contribute to feelings of connection when the individual is engaged in an actual social interaction and perhaps especially when that interaction is with a partner in an existing close relationship. Future studies might test the relationship stage (strangers, newly formed relationships, established relationships), type (communal vs. exchange, romantic vs. platonic, exclusive vs. consensually nonmonogamous), or other features (e.g., history of conflict, secure attachment) as moderators of the effects of an MDMA biointervention on connecting feelings and behaviors (for parallel research on opioids, cf. Inagaki, 2018).

What is the role of integration?

Long-lasting effects of an MDMA experience—assuming these effects are mediated and not direct—are also likely maximized if participants are successful at "integrating" and assimilating that experience. As just one example, no matter what the mediational sequence is (see Fig. 1), if study participants do not perceive their MDMA experience as opening the door to psychological change or growth that is at least partially accessible to them in their daily lives, then they are unlikely to experience enduring effects. Likewise, if participants fail to recognize shifts in how open, trusting, or motivated to connect they are while on MDMA, then they are unlikely to bring these shifts forward into real-life settings. Alternatively, they may not recognize such shifts until days, weeks, or months later (e.g., Bem, 1972; Schachter & Singer, 1962). These insights and new frames of the experience may come about only through integration, perhaps with guidance or instructions from a therapist, coach, experimenter, workbook, or even a smartphone app.

William James suggested that drug-induced subjective shifts "may determine attitudes though they cannot furnish formulas, and open a region though they fail to give a map" (James, 1902/1961, p. 388). Analogously, participants in the MDMA clinical trials anecdotally express the need to discuss and make sense of their experience and report that the benefits of the MDMA treatment are often not immediate but emerge over time as they remember and reprocess memories. For these reasons, many believe that drugs such as MDMA, although increasingly accepted by the medical establishment, should never be taken in a vacuum or without the right mental groundwork, and trialists have developed exceedingly careful and detailed plans for the type of guidance offered in MDMA-assisted psychotherapy (M. Mithoefer, 2017).

Future studies could test whether the effects of MDMA on social connection are stronger or more

enduring with versus without integration (both measured and manipulated) and with versus without a human or written guide. Because integration can be defined in different ways, investigators would need to develop their own criteria on the basis of the body of evidence to date. For example, after an MDMA-assisted session, a subgroup of participants could be asked to describe in writing any shifts they experienced in their fear and negativity, social positivity, and communication and chemistry (see discussions above), as well as how they plan to bring those experiences to bear on future social interactions (e.g., Slatcher & Pennebaker, 2006).

Notably, some individuals (e.g., those high in openness, curiosity, or self-complexity) might naturally reflect deeply on their MDMA experiences without any guidance—hence, the need to test participants' spontaneous attempts at integration as a moderator of long-term outcomes. Finally, it is worth noting that even in MDMA studies that do not deliberately introduce guided integration, the questionnaires that participants are asked to complete might serve this function anyway by directing participants' attention to their feelings, thoughts, and behaviors relevant to connection during the study sessions and during any follow-ups.

Who benefits the most from MDMA and under what conditions?

The effects of MDMA on social connection and other outcomes are likely to be moderated by individual-difference variables such as personality, loneliness, and mental health, such that those with the most trouble connecting or who rarely experience deep connection might show the biggest impacts. Whether this expected finding might be due to a floor effect or to such individuals' greater receptivity to an MDMA intervention or greater motivation to connect remains an open question. (The converse is that well-functioning individuals may show ceiling effects.)

Following Cohen and colleagues' (2017) pioneering theoretical framework of social-psychological interventions, the use of MDMA to promote connection and improve people's social lives should be targeted (i.e., given to the right person), tailored (i.e., given with the right support), and timely (i.e., given at the right time and place). For reasons of efficiency and ethics, a biointervention—such as one using MDMA in one or more doses—should ideally be delivered only to individuals who will benefit from it and are most open to it.

Tailoring the biointervention would involve identifying how people's vulnerability, cultural background, socioeconomic status, or other factors might moderate their responses to it. As one example, individuals who tend to connect less deeply than others during social interactions—for example, males (Eagly et al., 2020), people with autism (Rapin & Tuchman, 2008), narcissistic individuals (Ronningstam, 2020), or members of tight cultures (Kim et al., 2008)—might show stronger effects of MDMA on social connection, perhaps because they begin at a relatively lower baseline (e.g., less self-disclosure). Alternatively, such individuals might show weaker effects because they are relatively less motivated or less receptive to engaging socially. Finally, making the biointervention timelier may mean administering it during an opportune time period, in which people are more needful of or more open to connection (e.g., transition to college, relocation, retirement, breakup).

Future studies can establish whether the effects of MDMA are maximized only for vulnerable individuals or under difficult circumstances, as the above examples imply. Challenging that prediction, it is possible that people with relatively greater psychological resources (e.g., resilience, conscientiousness, ambition) or more opportunities for social connection may benefit from using MDMA the most, whereas vulnerable individuals may actually be harmed. Alternatively, MDMA may have an impact (e.g., boost extraverted behavior) of similar magnitude even in individuals with different starting points.

Can the use of MDMA backfire?

Because MDMA is a powerful psychoactive drug, it is critical to heed its potential physical side effects and harms (e.g., midweek "blues," drug tolerance; for mixed findings, see de Win et al., 2008; Green et al., 2012; Halpern et al., 2011; Meyer, 2013; Verheyden et al., 2003; Vizeli & Liechti, 2017). Indeed, additional safeguards are needed in human psychopharmacology research, including rigorous screening protocols (e.g., to exclude participants with medical and psychiatric contraindications). Furthermore, monitoring of cardiovascular effects throughout a study session is recommended, as well as extra vigilance and reporting of adverse events (for guidelines, see Food & Drug Administration, 2009). Moreover, just like any positive intervention, including practicing gratitude and kindness, can have unintended adverse consequences (for a review, see Fritz & Lyubomirsky, 2018), the use of MDMA to boost social connection or to improve relationships can also psychologically backfire.

For example, after a deep conversation while under the acute influence of MDMA, some participants might reach conclusions such as "I got a taste of what true connection feels like and I'll never replicate it" or "I don't deserve to feel this good." At best, in these cases, the MDMA experience will fail to have any salutary lasting effects; at worst, the thoughts can be distressing and may even strain an individual's relationship

self-efficacy, damage their general self-esteem, or increase, rather than lessen, loneliness. Future investigators would do well to carefully monitor such thoughts and side effects and test which baseline characteristics might be revealed as moderators. For example, individuals who are high in trait loneliness and hypervigilant for threat (Hawkley & Cacioppo, 2010) may feel worse after MDMA-assisted connection, which may reinforce their suspicions of other people's social motives ("They were nice to me only because they were on drugs") and lead them to feel even more vulnerable than before.

Likewise, individuals with low self-esteem or clinical levels of depression may feel that the MDMA-assisted connection was too good to be true and thus unrepresentative of their true selves, whereas those with insecure attachment styles might feel acutely uncomfortable after expressing intimacy to a partner during a session involving MDMA. If these characteristics are found to correlate with adverse outcomes, then MDMA biointerventions may need to be targeted (e.g., excluding certain populations) or tailored (e.g., adjusting procedures and paying special care to the subjective meaning and framing that participants draw from the MDMA session; see Walton & Wilson, 2018). Most important, both pre- and postsession integration with a trained experimenter or therapist may turn out to be particularly critical for vulnerable populations.

Other potential adverse effects are also worth noting. First, in rare cases, MDMA has been found to increase loneliness during the experimental sessions (perhaps because the individual is tested alone in a room; Bedi et al., 2010) and anxiety (perhaps because of its cardiovascular or sympathomimetic effects; Kirkpatrick et al., 2014). The boundary conditions for when such unpredicted effects occur would be important to uncover. Second, if using MDMA blunts reactivity to rejection, then the drug may lead to maladaptive outcomes in situations (e.g., involving bullying, discrimination, or abuse) in which rejection is an important signal that should be attended to and addressed.

Third, this article assumes that stronger social connection is always positive, but using MDMA might boost a sense of deep connection to the wrong person—for example, to an abusive partner, bigoted neighbor, or unrequited love, as well as the experimenter or guide administering the drug (on transference, see Levy & Scala, 2012). MDMA use might also potentially lead to infidelity or encourage self-disclosure to inappropriate others or at inappropriate times, thus rendering people vulnerable to regret, rejection, or loss. Finally, and most controversially, some believe that studying the long-term consequences of MDMA may be dangerous. What if researchers discover that after one or more MDMA sessions, some participants end up changing their lives—for example, decide to switch careers, join an extremist group, or get a divorce? Will such changes ultimately benefit or harm them and, if so, who is responsible? These questions are reminiscent of the ethical challenges and potentials for harm raised by Kramer (1993) in *Listening to Prozac* about so-called cosmetic psychopharmacology, an approach that involves using antidepressant drugs to make people feel "better than well." These are all important questions to deliberate on and consider before leaping into future work.

Other Future Research Questions About Connection and MDMA

Given the dearth of research on connection-relevant processes that are thought to influence and to be influenced by MDMA, numerous research questions remain unanswered. One such question is whether MDMA interventions might broaden—rather than narrow—people's thoughts, feelings, and behaviors (Fredrickson, 2013b). If future studies find that MDMA increases gratitude, elevation, self-regard, empathy, and self-compassion while decreasing rumination, worry, and regret, they will yield evidence consistent with the notion that MDMA gives rise to feelings of expansion and diminishes feelings of contraction (see Aron et al., 2003). Relatedly, MDMA could augment both the immediate and long-term effects of other positive interventions that serve to boost connection, such as those that instruct participants to act more extraverted or more prosocial in their daily lives, write letters of gratitude to close others, or learn how to practice loving-kindness meditation (see Fredrickson et al., 2008; Layous & Lyubomirsky, 2014; Margolis & Lyubomirsky, 2020).

In MDMA interventions investigating connection, including objective or observer-rated measures of constructs associated with or demonstrating connection would be highly valuable. For example, investigators could measure or code social interactions or conversations for synchronization of speech (for evidence with *d*-amphetamine and LSD, see Natale et al., 1979), behavioral synchrony (Vacharkulksemsuk & Fredrickson, 2012), neural synchrony (Stephens et al., 2010), auditory convergence (Reece, 2020), conversation gaps (Templeton et al., 2019), language-style matching (Ireland et al., 2011), eye gaze, Duchenne smiles, and positivity resonance (Otero et al., 2020).

Beyond MDMA and Connection: Promising Research Areas for Psychedelic Social Psychology

Although much exciting research and theory on the psychology of MDMA has already been conducted, this work is just beginning. One researcher described the

Table 1. Topics in Social Psychology Promising for Psychedelic Science

Creativity	Stress and coping
Self	Interpersonal relationships
Intergroup conflict	Attitude polarization
Prejudice and stereotyping	Judgment and decision-making
Aggression	Negotiation and conflict management
Rumination and worry	Mindfulness and meditation
Emotion regulation	Spirituality
Physical health and health behavior change	Autobiographical memory
Mental health	Habit formation
	Attribution

current state of knowledge about psychedelics this way: "Think crayon drawing, rather than oil painting" (Shroder, 2015, p. 248). Filling in the gaps—and expanding the margins—requires creativity and vision. Yet social psychology is such a wide and fascinating field, I expect an avalanche of ideas for relevant research questions and paradigms to emerge. In his best-selling textbook, Myers (2013) defines social psychology as "the scientific study of how people think about, influence, and relate to one another" (p. 4). This definition highlights the relevance of MDMA and other psychoactive substances—which operate in large part by affecting how users think, influence, and relate—to the topics at the center of social-psychological science.

Table 1 shows a list of topics that are promising as starting points for discovery in bringing to bear psychedelic science. That is, psychoactive drugs—which include not only psychedelics but substances such as cocaine, alcohol, and caffeine—have potential for illuminating these processes and constructs. An obvious case in point is prejudice and intergroup conflict. At a time of great antagonism, partisanship, and bigotry both in the United States and globally, one would be hard-pressed to find a more important research endeavor than elucidating the mechanisms that generate empathy, openness, trust, connectedness, and compassion toward people who are different in viewpoint, gender, ethnicity, culture, or class. Because of their properties of forging a sense of oneness and connection, including others in the sense of self, and thinking outside the box, substances such as MDMA, psilocybin, and LSD have the potential to reduce prejudice, stereotyping, attitude polarization, and intergroup conflict when used with individuals or groups brought together in laboratory or field settings, or perhaps even when individuals are simply prompted to think about out-group members (for preliminary effects of MDMA and psilocybin on moderating authoritarianism, see de Wit et al., 2021; Lyons & Carhart-Harris, 2018; however, on oxytocin's effects on in-group favoritism, see De Dreu, 2012).

As another example, psychedelic substances such as psilocybin have been shown to foster ego dissolution, a fascinating process that may illuminate the concept of the self (e.g., Griffiths et al., 2008; Holze et al., 2020; Lebedev et al., 2015; Smigielski et al., 2019; for a review, see Taves, 2020,). After all, what better way to study a phenomenon (like one's identity) up close than when it is essentially dismantled and temporarily disassembled before one's eyes. Such observations could unpack which layers of the self are experienced as "dissolving" (or perhaps expanding; see Aron et al., 2003)—for example, the bodily self, the cognitive self, the social self—and which are critical to a range of phenomena, such as sexual behavior, person perception, empathy, emotion regulation, and interoceptive processing (e.g., Palmer & Tsakiris, 2018; see Lester, 2015).

Furthermore, when the boundaries between the self and the outside world (or other people) fall away, a variety of experiences studied by social psychologists may follow—for example, transcendence and awe, unity and compassion for all humans (and all organisms), unconcern with mortality, and an expanded sense of self. Inducing these difficult-to-bottle experiences with a dose of psychedelics in a sample of participants—and then assessing them with both self-report, behavioral, and biological measures—may thus advance our understanding into the processes that drive them, as well as their antecedents and consequences.

As described above, completed and in-progress clinical trials are testing the efficacy of several different psychedelics in alleviating a range of mental-health conditions. The focus on severe psychiatric disorders is not surprising because regulatory agencies are typically tasked with protecting public health and overseeing trials to treat disability and illness. However, psychedelic drugs hold great promise in contributing to physical health and well-being in individuals with no diagnosable disorders. Hence, tests of how LSD might boost creativity or relieve daily stress or how psilocybin might prompt people to practice healthy habits would be valuable to both scientists and laypeople.

Finally, although the focus of this article is on social-psychological constructs, personality psychology also stands to benefit from research with psychoactive

drugs. Previous studies have already shown that psychedelics could potentially affect the Big Five traits, lending further support to the notion that these substances can have long-term impacts on social life. For example, ingesting psilocybin had a positive and lasting effect on the personality (primarily openness) of most participants a year later (MacLean et al., 2011), as well as on extraversion and neuroticism 3 months later (Erritzoe et al., 2018; on the effects of LSD on openness, see also Lebedev et al., 2016,), and ingesting MDMA increased openness (Schmid et al., 2014) and lowered neuroticism (Wagner et al., 2017). In light of the relative stability of personality (Damian et al., 2019), these results are striking and warrant further research, both to replicate and to analyze other personality dimensions. For example, would an MDMA biointervention reduce narcissism (because it fosters partner responsiveness) or, alternatively, increase it (because it prompts people to think and talk more about themselves)? Would an MDMA intervention, by extinguishing anxiety responses to potential perceived threats and insecurities, reduce neuroticism? And, if scientists can truly change personality with drugs, then what are the implications for what it even means to have a personality—how to understand it, measure it, and identify its biopsychosocial roots (cf. Kramer, 1993)?

Conclusion

Psychedelic social psychology is an exciting new frontier, and I hope that its fruits are as illuminating for scientists and valuable for laypeople as psychedelic medicine has shown to be to date. I believe that social psychologists have much to gain by incorporating psychoactive drugs into their research programs. I have used MDMA as an example because of its track record both as a window into what underlies feeling connected, loved, and understood and as a potential catalyst of social connection in everyone, but especially in those with social obstacles or deficits. More broadly, however, the research and thinking outlined in this article highlights how human psychopharmacological methods can serve as a useful approach for understanding how commonly studied social-psychological processes—for example, connectedness or creativity or stress—are influenced and revealed by psychoactive drugs. Another promising frontier entails designing and conducting biointerventions, which apply a biotechnology (such as LSD or MDMA) to alter—and thus elucidate—people's psychological machinery (i.e., their sense of connection or their self/identity) with the aim of improving people's lives (Earp & Savulescu, 2020).

I submit that substances such as MDMA—and its psychedelic cousins—may well be reflecting the zeitgeist of this moment, in part because they fit with both collectivist and individualist ideals. First, at a time when because of both desire and necessity more and more people are moving toward digital interactions and away from in-person and intimate contact (e.g., Julian, 2018; Twenge, 2017), many in today's society are arguably hungry for deep face-to-face social connection—something that MDMA and classic psychedelic compounds are positioned to foster. Second, MDMA experiences are both hedonic and eudaimonic. They offer pleasure—a pleasant state suffused with positive emotion, the delight of viewing beauty, and the pleasure of touch. Yet their defining characteristic is eudaimonic, leading users to feel loving, connected, empathetic, grateful, and in flow. MDMA is also in tune with the present day because under its influence, people feel not only connected and interdependent but also authentic, self-aware, and inner-directed. A guide or therapist can support the individual in preparing for and processing the experience, but the experience is self-generated, and only the individual knows where to go (Doblin, 2020). Thus, the time is ripe to harness the potential of psychedelic and related substances to elucidate unmapped terrain about constructs of interest to social psychologists and, at long last, to fully accept psychedelics into mainstream science and get past their association with "turning on, tuning in, and dropping out" (Leary & Clark, 1967).

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Notes

1. Although the subjective perception of being connected is theoretically distinct from objective social connections (such as number of friends or frequency of social contact), the two constructs are correlated and both predict well-being (e.g., Cacioppo et al., 2008; Kahneman et al., 2004; Mehl et al., 2010; Sun et al., 2020).
2. Work with animal models is also revealing, showing, for example, that MDMA lowers aggression and increases prosocial behavior in rats and promotes adjacent lying or "cuddling" in both rats (for a review, see Kamilar-Britt & Bedi, 2015) and octopuses (Edsinger & Dölen, 2018).
3. Many human psychopharmacology studies, for safety reasons, are conducted with individuals who have prior experience with the substance. Although this approach reduces the risk of unexpected adverse reactions, it increases the possibility of expectancy effects.

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