THE RELATIONSHIP BETWEEN THEORY OF MIND AND THE PSYCHEDELIC EXPERIENCE

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University of Split
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The relationship between Theory of Mind and the psychedelic experience

Bachelor thesis

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1. Introduction

Theory of Mind (ToM), the term coined by Premack and Woodruff (1978), is the cognitive capability of understanding another's mind. Theory of mind is defined as the ability to attribute mental states to oneself and others and is often said to be one of the cornerstones of efficient social interaction (Cole & Millett, 2019). Westera & Carruthers (2018) define it as the capacity to predict and interpret behavior by using representations of hidden mental states. It consists of the ability to use concepts of intentional mental states, such as beliefs, emotions, intentions, goals, and perceptual states, in order to predict and interpret behavior. Thinking about the mind is a common human activity, we consistently see each other as individuals taking intentional action based on our underlying beliefs and desires (Wellman, 2010). The term has a plethora of different names such as “commonsense psychology,” “naïve psychology,” “folk psychology,” “mindreading” and “mentalizing”. Scholars have suggested that Theory of Mind is an innate adaptation for social cognition, emerging very early in development and playing a crucial role in social learning and the acquisition of language (Baron-Cohen 1997). However, others have argued that Theory of Mind is the product of largely domain-general learning processes and is acquired gradually throughout development through social experience (Wellman 2014). A third view argues that humans possess two systems for theory of mind: an innate, domain-specific “implicit” system and a learned, domain-general “explicit” system (Apperly and Butterfill 2009). Wellman (2010) defines individuals who engage in intentional actions and subjectively experience the world as intentional agents. Intentional actions are goal-directed behaviors that reflect an agent's psychological states, such as goals, desires, and intentions. Understanding intentional agents is important for Theory of

Mind because it involves recognizing that individuals not only act with specific goals in mind but also have subjective experiences that influence their behavior.

Psychedelics (serotonergic hallucinogens) are powerful psychoactive substances that alter perception and mood and affect numerous cognitive processes (Nichols, 2016). They are generally considered physiologically safe and do not lead to dependence or addiction (Nichols, 2016). Their origin predates written history, and they were employed by early cultures in many sociocultural and ritual contexts. Nichols (2016) described psychedelics to be unique apart from other classes of drugs:

> "…the feature that distinguishes the psychedelic agents from other classes of drug is their capacity reliably to induce states of altered perception, thought, and feeling that are not experienced otherwise except in dreams or at times of religious exaltation."

This study will delve into the biological development of Theory of Mind and various theoretical approaches for Theory of Mind. Additionally, it will explore the psychedelic experience and what constitutes as a mystical experience.

1.1. The development of the Theory of Mind

Baron-Cohen (1997) posits that brains evolve in stages termed "modules," each serving specific adaptive purposes, and he identifies four such modules that underlie the distinctly human ability for "mind reading." These modules include (1) The Intentionality Detector (ID), attributing desires and goals to various entities, from inanimate objects to prominent figures. (2) The Eye-Direction Detector (EDD), specialized in identifying eye-like stimuli and determining their gaze direction. (3) The Shared Attention Mechanism (SAM), facilitating the monitoring of others' attention and

directing attention to mutually interesting objects through gestures and verbal cues. (4) The Theory of Mind Mechanism (ToMM), enables the generation of hypotheses about others' mental states, including knowledge, thoughts, intentions, and pretenses. This latter module, represents the highest level of mind reading, typically emerging around the age of four. Baron-Cohen suggests that the neurological basis of the mind-reading system is contained in a “three-mode brain circuit involving the superior temporal sulcus, the orbitofrontal cortex, and the amygdala”. However, it was found in later research that the medial prefrontal cortex, temporoparietal junction, posterior cingulate, and precuneus are the main components of this network (Carlson et.al., 2013). Wellman (2010) emphasizes that infants' early understanding of intentional agents plays an important role in the development of Theory of Mind by observing and interpreting intentional actions, infants begin to grasp that individuals behave according to their desires, emotions, and perceptual experiences.

Apperly and Butterfill (2009) defined two systems for Theory of Mind:

1. **Early-Developing System for Tracking Registrations**: The first system is described as an early-developing system that guides children's eye movements based on tracking registrations. This system is hypothesized to operate at a more implicit level, influencing children's behavior without requiring explicit understanding or verbal responses. Children may demonstrate an ability to pass certain belief reasoning tasks when their gaze is considered as the relevant measure, even before they can provide accurate verbal responses.

2. **Later-Developing System for Explicit Judgments about Beliefs**: The second system is characterized as a later-developing system that guides children's explicit judgments about beliefs. This system is thought to involve more conscious and deliberate processes, leading to explicit understanding and verbal responses related to belief reasoning tasks. Children typically

demonstrate a more sophisticated understanding of beliefs around 4 years of age, indicating the development of this later system.

The authors suggest that these two systems work in tandem, with the early-developing system influencing children's eye movements and implicit responses, while the later-developing system supports explicit judgments and verbal reasoning about beliefs. The distinction between these two systems allows for an understanding of how belief reasoning develops in humans across different ages and cognitive levels. Furthermore, they argue that these two systems make different trade-offs between flexibility and efficiency in processing belief-like states. The early-developing system may prioritize efficiency by relying on implicit cues and registrations, while the later-developing system may prioritize flexibility by allowing for more explicit reasoning about the causes and justifications of mental state.

1.2. Approaches to Theory of Mind

The Theory-Theory

Before empirical researchers got involved, philosophers started working on the theory of mind, and their ideas had an impact on empirical research. Wilfrid Sellars' essay "Empiricism and the Philosophy of Mind" jumpstarted the field and was later known as the "theory-theory" (Sellars, 1956). This theory suggests that people have a basic or "naïve" theory of psychology, which helps them infer the mental states of others like their beliefs, desires, or emotions (Ratcliffe, 2006). Developmental psychologists have widely embraced this idea. Philosophers argue that the theory of mind is so effective that it helps us predict invisible behavior. Theory of mind includes lawlike generalizations that link observable inputs to certain mental states, certain mental states to other

mental states, and mental states to observable outputs (behavior). "Persons who have been physically active without drinking fluids tend to feel thirst" is an example of the first type of law. "Persons in pain tend to want to relieve that pain" is an example of the second type, and "People who are angry tend to frown" is an example of the third type (Goldman, 2012; p. 3.). Josef Perner, Alison Gopnik, Henry Wellman, and Andrew Meltzoff are among the developmental psychologists who have supported the Theory-Theory and tried to apply it to young children. Through false-belief tasks, researchers have found a noticeable change in children between three and four years of age. Three-year-olds tend to fail the false-belief task, whereas four-year-olds tend to pass (Wimmer & Perner, 1983). Theory theorists attribute this difference to a change in children's thinking between the ages of three and four. At the age of three, children usually think of desire and belief as simple connections between themselves and the external world, which do not allow for the possibility of error. They don't yet understand the concept that a belief can be false. Compared to adults, three-year-olds lack a representational theory of belief, which is why they have a "conceptual deficit" (Perner, 1991) and can't pass the false-belief test. In the early '90s, this explanation was very popular. However, several subsequent findings seriously challenged the conceptual-deficit approach. In 1991, Mitchell and Lacohee demonstrated that various experimental manipulations could enable three-year-olds to pass the tests. Even stronger evidence against the traditional Theory-Theory was discovered in 2005, in which a study was conducted on 15-month-old children using a non-verbal false-belief task (Onishi and Baillargeon, 2005). The Onishi and Baillargeon (2005.) study involved 56 healthy-term infants. Infants first watched an actor hide a toy in one of two boxes. After that, when the actor searched for the toy in the box that was inconsistent with the actors beliefs, the infants looked longer at the actor which was interpreted as a sign of surprise and confusion, indicating that the infants recognized a mismatch between the

actor's belief and their action. The results indicated that the infants looked reliably longer when the actor's search location was inconsistent with her belief about the toy's location. The infants' looking time serves as evidence that they possess an early understanding of how beliefs influence behavior, which is a key component of theory of mind.

The False-belief Task

The false-belief task stands out as the most employed task in ToM research literature. Given the considerable attention directed towards this task, it is valuable to explore the distinct assumptions frequently associated with this task. The false-belief task is designed to test an individual's understanding of the concept that their beliefs or representations of the world may differ from reality. It is a commonly used methodology to examine a child's theory of mind, which refers to their ability to attribute internal mental states, such as beliefs, to others. The test can distinguish between a child's true belief and their awareness of someone else's false belief (Dennett, 1978). First-order false-belief tasks relate to an individual's attribution of false beliefs to others regarding real events. Second-order false-belief tasks involve what one person thinks about another person's thoughts. In these tasks, the child must attribute a false belief of one person based on the thoughts of another (Perner & Wimmer, 1985). The "Smarties" task is an example of a commonly used first-order false-belief task. The task requires the child to predict another child's perception of the contents of a box of candies, which actually includes a pencil (Gopnik & Astington, 1988). The Perner and Wimmer (1985) "ice-cream van story" is an example of a commonly used second-order false-belief task. In this story, Mary is asked to predict John's thoughts about the location of the ice-cream man. Only Mary knows the actual location (in the school), but John knows about his former intention to stay in the park. Therefore, Mary must take into account John's thoughts about the location of the ice-cream man, based on the ice-cream man's original intentions.

The false-belief task is usually failed by children before they turn four years old and many adults with autism spectrum disorder (Wellman et al. 2001). However, there is a disagreement about the interpretation of these results. Constructivists believe that children's changing performance on this task indicates that they are learning new concepts of belief, which is a fundamental change in their intuitive theory of the social world, much like scientific discovery (Gopnik and Wellman 1992). On the other hand, Nativists believe that the selective deficits in the false-belief task displayed by people with autism spectrum disorder provide evidence of an underlying theory-of-mind module, which is selectively impaired in autism (Baron-Cohen 1997). They also believe that younger children's difficulties with the false-belief task are not due to a lack of understanding of belief, but rather a performance error resulting from the immaturity of their general cognitive abilities. According to this view, the concept of belief is innate, but children may have trouble using it effectively in certain experiments.

The Rationality-Teleology Theory

Another group of philosophers, particularly Daniel Dennett (1987), have proposed a different approach to Theory of Mind. Their central idea is that one can understand another person's thoughts by "rationalizing" them, attributing them to a set of beliefs and desires that make them look like rational thinkers and agents. Dennett argues that our everyday psychology is based on a particular perspective we take when trying to predict others' behavior, which he calls "the intentional stance." To adopt the intentional stance is to assume that the person whose behavior we are trying to explain is rational, and that their beliefs and desires are the ones they have formed based on their environment and other mental states. Dennett's intentional stance theory is not based on empirical research but rather on thought experiments. One issue with the theory is that it only addresses the

attribution of propositional attitudes, such as beliefs and desires (Goldman, 2012). What about other types of mental states, such as sensations (e.g., thirst or pain) and emotions (e.g., anger or happiness)? These states are also attributed to others, but it is unclear how rationality considerations apply to them. Therefore, mindreading must involve more than just imputing rationality. Although the intentional stance theory was initially based on philosophical reflection, it has also inspired some experimental research that supports it (Goldman, 2012). For example, Gergely and Csibra (2003) proposed the "teleological stance," which is an interpretational system for actions based on means-ends efficiency. They switch from the intentional stance to the teleological stance, which is a different but developmentally related interpretational system. The teleological stance only refers to actual and future states of reality and is not mentalistic (Goldman, 2012). The simulation theory might explain the teleological stance, suggesting that young children project themselves into the shoes of the acting object and consider the most efficient means to its goal. They then expect the object to adopt these means.

Simulation Theory

The simulation theory, also known as the “empathy theory,” is the third approach to Theory of Mind. Robert Gordon (1986) was the first to propose it, suggesting that we can predict the behavior of others by asking ourselves, “What would I do in that person’s situation?”. Imagine that you are trying to write a persuasive email to your boss to convince them to let you work from home. To do this effectively, you might imagine yourself in your boss's shoes, considering their concerns and priorities. You might try to anticipate their objections and address them in your email. By imagining yourself in your boss's position, you can better understand their perspective and communicate your position more compellingly. The core idea of the simulation theory is that

mindreaders simulate a target by trying to create similar mental states of their own as proxies of those of the target (Goldman, 2012). These initial pretend states are fed into the mindreader's cognitive mechanisms to generate additional states, some of which are then attributed to the target. In other words, attributors use their own mind to mimic or "model" the target's mind, thereby determining what has or will transpire in the target (Goldman, 2012).

The original form of simulation theory (ST) focused primarily on the attribution of propositional attitudes. However, in recent years, ST has shifted its focus to simpler mental states and processes of attribution that were rarely dealt with in the early ToM literature. The critical question for Theory of Mind, however, is whether mindreading, i.e., mental attribution, occurs as a result of mirroring. In 2005, humans were subjects in an fMRI study conducted by Iacoboni et al. The study (Iacoboni et al. 2005) presented video clips with three types of stimulus conditions: (1) grasping hand actions without any context ("Action" condition), (2) scenes specifying a context without actions, i.e., a table set for drinking tea or ready-to-be cleaned up after tea ("Context" condition), and (3) grasping hand actions performed in either the before-tea or the after-tea context ("Intention" condition). The Intention condition yielded a significant signal increase in premotor mirroring areas where hand actions are represented. The investigators interpreted this as evidence that premotor mirror areas are involved in understanding the intentions of others, in particular, intentions to perform subsequent actions (e.g., drinking tea or cleaning up). However, this mind-reading conclusion is somewhat problematic because there are alternative interpretations of the findings (Goldman, 2008). One would say that the enhanced activity in mirror neuron areas during observation of the Intention condition involved only predictions of actions, not attributions of intentions. Predicting actions does not qualify as mindreading since actions are not mental states. However, the Iacoboni et al. (2005) study presented evidence of intention attribution above and

beyond the fMRI evidence. After being scanned, subjects were debriefed about the grasping actions they had witnessed. They all reported representing the intention of drinking when seeing the grasping action in the during-tea condition and representing the intention of cleaning up when seeing the grasping action in the after-tea condition. Their verbal reports were independent of the instructions the subjects had been given at the outset. Thus, it is quite plausible that their reported intention attributions were caused by activity in the mirror area. So the Iacoboni et al. (2005) study does provide positive evidence for its stated conclusion. Low-level mindreading can be viewed as an elaboration of a primitive tendency to engage in automatic mental mimicry. Both behavioral and mental mimicry are fundamental dimensions of social cognition (Goldman, 2012). The concept of mental simulation involves re-experiencing or re-enacting a mental event or process. It is an attempt to relive a mental event (Goldman, 2006). According to Goldman (2012), this cognitive operation is most commonly used in reading others' minds and is known as "enactment imagination". Enactment imagination is an extensively used cognitive operation that produces visual and motor imagery. Visualizing something means trying to construct a visual image that resembles the experience one would undergo if they were to see what is visualized. For instance, visualizing the Mona Lisa is attempting to produce a state that resembles the experience of seeing the Mona Lisa. Kosslyn (1994) has demonstrated that the processes and products of visual perception and visual imagery have substantial overlap. The visual field of imagination overflows an imagined object at about the same imagined distance from the object as it does in real visual fields. Neuroimaging reveals those parts of the brain active during vision and during imagery overlap. Motor imagery occurs when one imagines moving their effectors in a specified way, for example, playing a piano chord with their left hand or kicking a soccer ball. It has been

convincingly shown that motor imagery corresponds closely, in neurological terms, to what transpires when one executes the relevant movements (Jeannerod, 2001).

1.3. Psychedelics and Mystical Experience

Psychedelics are a class of psychoactive substances that primarily alter cognition, perception, and mood by affecting the serotonin receptors in the brain, often leading to experiences characterized by altered states of consciousness, visual and auditory hallucinations, and profound changes in thought processes and emotional state (Nichols, 2016). One of the most well-known psychedelics, psilocybin, is found naturally in certain species of mushrooms and has been used ceremonially by the Mazatec people of Mexico in shamanic practices for centuries (Guzman, 2008). Guzman (2008) also found *psilocybe* was considered a sacred mushroom in indigenous Mexican cultures. Another prominent psychedelic, peyote, comes from the mescaline-containing cactus native to North America and has been used by indigenous tribes such as the Native American Church in ceremonial contexts (Halpern, 2004). In the 20th century, psychedelics gained popularity in Western society as substances of interest to researchers with LSD (lysergic acid diethylamide) in particular. A Swiss scientist Albert Hoffman discovered it in 1938 while researching the medicinal uses of ergot, a fungus that grows on rye and other grains (Hoffman, 2013). Researchers investigated its use in treating conditions such as alcoholism, depression, and anxiety (Grinspoon & Bakalar, 1981). However, the widespread recreational use of psychedelics, along with concerns about their safety and potential for abuse, led to their criminalization and prohibition in many countries during the late 1960s and early 1970s as a part of the “War on Drugs” (Passie et al., 2008). In recent decades there has been a resurgence of interest in psychedelics for their therapeutic

potential, particularly in the treatment of mood disorders such as depression and anxiety. Clinical trials including psilocybin and MDMA, have shown promising results, leading to a reassessment of their therapeutic value (Carhart-Harris et al., 2021). However, recent systematic reviews are under suspicion of fraudulent data or have shown that there is no evidence for the claims they are making (Colcott et. al, 2024). A notable study was conducted by Johnstand (2020), where he explored the experiences of individuals who claimed to have telepathic communication while under the influence by psychedelics through interviews. The study included both individuals who reported positive and negative experiences with telepathy while using psychedelics, and the findings revealed three main types of telepathic communication: Information exchange, telempathy and telepathic unity (Johnstand, 2020). Information exchange refers to instances where participants believed they were transmitting and receiving information telepathically with another person. Telempathy is the experience of a deep emotional connection with others where they share emotions telepathically. Telepathic unity was mentioned by only a few participants; they reported a feeling of merging or unity with another person accompanied by a feeling of dissolving individuality. While some participants found these telepathic experiences profound and transformative, others expressed concerns about the intensity and unpredictability of the telepathic states. These felings of telempathy, information exchange and telepathic unity is what may connect psychedelics with theory of mind.

Wulff (2000) states that any experience qualified as mystical diverges in fundamental ways from ordinary conscious awareness and leaves a strong impression of having encountered a reality different from—and, in some crucial sense, higher than—the reality of everyday experience. From diverse descriptions and traditional mystical texts, scholars have created a common set of fundamental traits that remain consistent across various contexts. One of the most well-known and

enduring depictions of mystical experiences comes from William James in 1902. In his work (James, 1958), he outlined two critical traits of a mystical experience: negative and positive. Positive mystical experiences are often transformative and bring a profound sense of peace, joy, and connectedness. James gave examples such as religious conversion, where an individual may experience a sudden and overwhelming sense of God's presence, which leads to a life-changing religious conversion. Another type of positive mystical experience is Nature-induced mysticism. That is a mystical experience triggered by the beauty of nature. For example, seeing a beautiful sunset or observing the sounds while in a forest can lead to a temporary loss of self-identity and to a deeper understanding of life's significance. On the other hand, negative mystical experiences, as described by James (1958), may lead to feeling overwhelmed and isolated. Some individuals are overwhelmed by the intensity of their mystical experience, making them feel so isolated, as if they are in an "abyss." Those unprepared or unwilling to face these experiences can feel confused and distressed due to the psychological strain caused by the intense mystical experience. Stace (1960) identified common elements of mystical experiences across different cultures and religions, such as the unifying vision, the sense of sacredness, and the deeply felt positive mood. These experiences can lead to lasting changes in perception, values, and behaviors, often resulting in increased psychological well-being and life satisfaction (Griffiths et al., 2008). Such experiences are characterized by ineffability, meaning they defy adequate expression in words. Thus, like emotional states, they can only be fully understood by those who have directly experienced them. They also possess a noetic quality, representing a profound and authoritative understanding or insight beyond ordinary intellectual comprehension (James, 1958).

1.4. Theory of Mind and Psychedelic Experience

A meta-analysis conducted by Soares et al. (2023) aimed to investigate the interplay between the Default Mode Network (DMN) and Theory of Mind in the context of psychedelics and shed light on how these substances affect social cognition. The DMN is thought to be involved in a range of internally focused cognitive processes, including self-reflection, often associated with daydreaming, self-referential thoughts, recalling memories, envisioning the future, and understanding the perspectives of others (Buckner et al., 2008). Through a meta-analysis of 88 studies involving over 2,100 participants, the authors found overlaps in brain activation patterns associated with social cognition and ToM, particularly in regions such as the cingulate cortex and the middle frontal and temporal gyri. Psychedelics were shown to modulate connectivity within the DMN, enhancing activation in areas important for both self-referential thought and social cognitive processes. The study highlighted the importance of understanding the neural mechanisms underlying these effects, suggesting that psychedelics could promote neuroplasticity and enhance the integration of self-related and social cognitive functions, thereby enhancing our understanding of social cognition. Another component that could deepen our understanding of the interplay between psychedelics and Theory of Mind is mirror neurons.

Mirror neurons were first discovered in the early 1990s by a team of Italian researchers led by Giacomo Rizzolatti. The mirror neuron system (MNS) is a group of specialized neurons that "mirrors" the actions and behavior of others (Rajmohan & Mohandas, 2007). They are a class of neurons that modulate their activity when an individual executes a specific motor act and when they observe the same or similar act performed by another individual (Kilner & Lemon, 2013). Heyes (2010; p.789) wrote:

> "[mirror neurons] intrigue both specialists and non-specialists, celebrated as a 'revolution' in understanding social behaviour … and 'the driving force' behind 'the great leap forward' in human evolution…".

Its involvement is implicated in social cognition, language, empathy, and theory of mind (Rajmohan & Mohandas, 2007). The MNS involves affective sharing between self and others, perspective-taking, self-agency, and self-regulation, all essential components of empathy. The capacity to acknowledge that others possess minds distinct from one's own, to deduce another person's thoughts through non-verbal signals, and to comprehend intentions is associated with the mirror neuron system (MNS). This mirroring mechanism is thought to be the foundation for action understanding and imitation (Rizzolatti & Craighero, 2004). Whether mirror neurons arise due to a functional adaptation and/or associative learning during development are important questions that remain to be solved (Kilner & Lemon, 2013).

Research suggests a strong neurobiological link between mirror neurons and the Theory of Mind. Both systems are believed to overlap in their function and location within the brain. The regions where mirror neurons are located, such as the inferior frontal gyrus and the inferior parietal lobule, are also involved in ToM tasks (Gallese & Goldman, 1998). Functional MRI studies have shown overlapping activation patterns in the brain during tasks involving action observation (mirror neurons) and mental state attribution (ToM), further supporting their connection (Carr et al., 2003).

Research on the connection between psychedelics and mirror neurons is scarce. However, psychedelics have been reported to enhance empathy and prosocial behavior, which might be linked to their effects on the mirror neuron system. For instance, studies have shown that psychedelics can increase feelings of connectedness and empathy towards others (Griffiths et al.,

2008). This could be due to the modulation of neural circuits involved in social cognition and empathy, potentially including the mirror neuron system.

Study Aim: This qualitative study aims to explore how individuals who voluntarily submitted reports of psychedelic experiences incorporate and reflect elements of Theory of Mind during altered states of consciousness by using the general inductive approach on the self-reports.

2. Methods

Study design: Descriptive qualitative study using general inductive approach

Participants

The units of analysis in this study were reports by individuals who had voluntarily submitted detailed psychedelic experience reports to the online forum "Shroomery" https://www.shroomery.org/ . Shroomery is a website dedicated to the discussion of psychedelic mushrooms and has become one of the most popular and respected forums for information about psychedelic mushrooms and the experiences they induce. The site includes reports for sharing psychedelic experiences and forums to discuss the reports, mushroom cultivation techniques, harm reduction, and identification of different species of psychedelic mushrooms. It also has guides and tutorials on how to grow mushrooms and the proper way to approach and use mushrooms. It has a strong sense of community where individuals can ask questions, share knowledge, and support

each other in their psychedelic journeys. The submissions of the randomly selected psychedelic experiences spanned from 1999 to 2016. A total of 50 reports were randomly selected out of a total of 7317 reports of psychedelic experiences. The anonymity of these reports was secured by the use of usernames and pseudonyms by the users of the site. The site does not require any personal information such as real names, addresses, or phone numbers, thus minimizing the risk of personal data being exposed.

Materials

The primary material used for this study was a dataset of reports of psychedelic experiences from "Shroomery" compiled into an Excel sheet by Žuljević et al. (2023). The authors gave permission to use their dataset which included 7317 psychedelic experiences reported by individuals on the online forum.

Procedure

The 7317 reports of psychedelic experience were put in a random number generator in order to choose which reports to code and 50 reports were randomly selected through the website "calculatorsoup" https://www.calculatorsoup.com/calculators/statistics/random-number-generator.php. The qualitative data analysis was conducted using general inductive approach to identify recurring themes related to ToM in the context of psychedelic experiences. The general inductive approach is a widely used qualitative research methodology that allows researchers to derive themes, patterns, and categories directly from raw data (Thomas, 2006). This approach is particularly effective in studies where the research objectives are broad and exploratory (Bryman, 2012). The approach involves repeated reading and coding of the data, allowing themes to emerge gradually as the researcher becomes more familiar with the content (Thomas, 2006). The steps

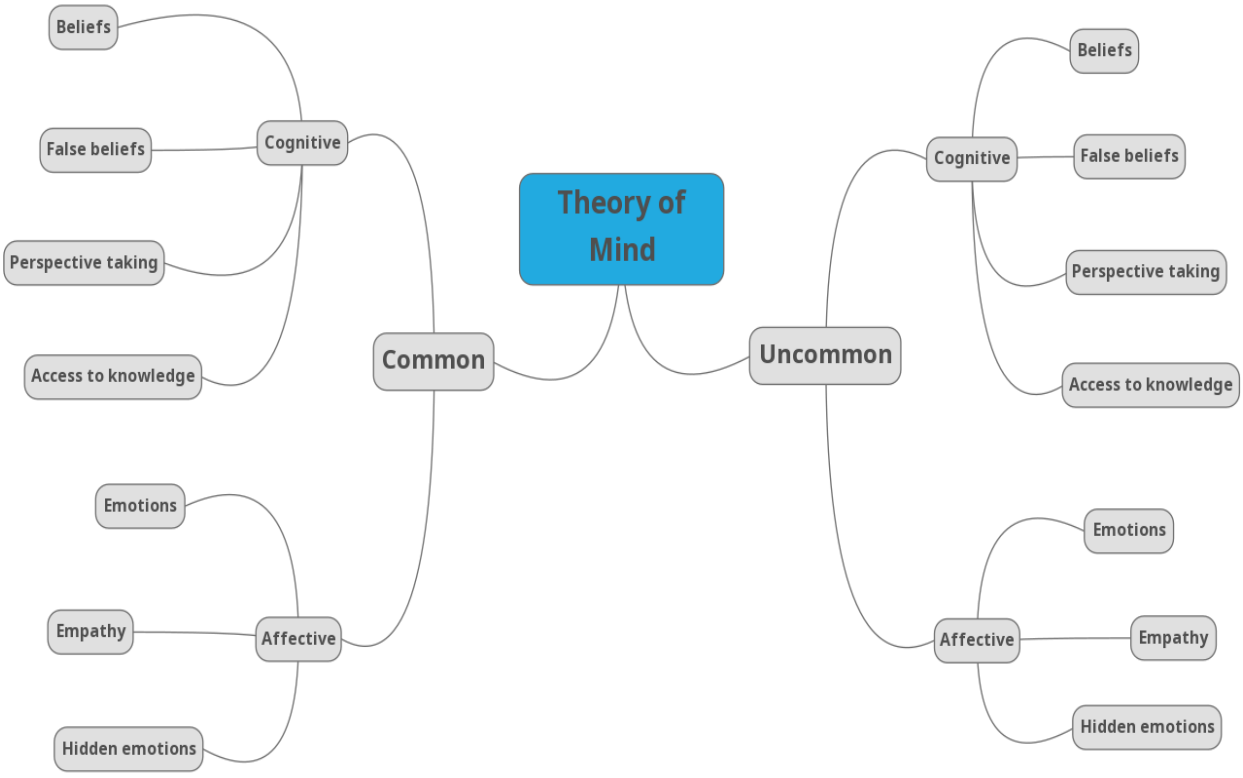
involved in the general inductive approach are organizing the data in a way that allows for easy interpretation and understanding by creating visual representations that illustrate the relationships among categories derived from the analysis, interpreting the data and making conclusions based on the analysis and guiding the analysis by evaluation objectives which help identify relevant themes (Thomas, 2006).

A codebook was developed to categorize and analyse the reports of psychedelic experiences. Each report was reviewed and coded (if possible) until code saturation happened due to the stagnation of new codes being formed. This involved identifying and marking text segments that connected specific aspects of the psychedelic experience to ToM constructs. The coding was done deductively with two main broad codes (Common and Uncommon ToM) and two sub-codes (Affective and cognitive aspects) to each of the broad codes. Common ToM broad code includes typical or expected interactions with ToM constructs, while the Uncommon ToM broad code captures those experiences that are atypical or altered by the psychedelic state. Within each of these, the Affective and Cognitive sub-codes further categorized the contents of the reports into emotional and knowledge-based aspects of Theory of Mind.

3. Results

The reports described the individuals' experience of psychedelic mushrooms starting from their consumption to the end of the "trip" through a description of how they felt throughout the "trip", how they interacted with their surroundings, and how they were thinking during the "trip". The duration of experiences ranged from a couple of hours to 8 hours. Two main codes were pre-defined, stemming from Theory of Mind (Figure 1). The Common main code of Theory of Mind involves understanding another person's thoughts, beliefs, and intentions, which is the common form. The Uncommon main code involves attributing thoughts and intentions to animals, nature, inanimate objects, or other individuals but in unusual ways. The sub-codes focus on the affective and cognitive aspects of Theory of Mind within both common and uncommon experiences during psychedelic "trips". The affective sub-codes explore how users perceive and react to the emotions of others, including typical emotional recognition and altered recognition, such as sensing emotions in animals, plants or inanimate objects. Cognitively, the sub-codes address how individuals understand others' beliefs and knowledge, encompassing standard processes as well as more atypical experiences. These include attributing thoughts and intentions to non-human agents or objects, thus showing an altered or expanded perception of intentionality. The affective sub-code consists of aspects such as emotions, empathy, and hidden emotions and the cognitive sub-code consists of aspects such as access to knowledge, perspective taking, real beliefs, and false beliefs.

Figure 1. Thematic map showing broad codes and sub-codes that were established before coding.



Broad Code 1: Common

"Common" theory of mind typically involves interactions between an individual and an intentional agent - another person who is perceived to have their own thoughts, feelings, and motivations. Within this broad code, two sub-codes were created which refer to either the affective or cognitive aspect of ToM as well as the elements that constitute the cognitive aspect (beliefs, false beliefs, perspective taking, and access to knowledge) and the affective aspect (emotions, empathy, and hidden emotions)

Cognitive

The cognitive aspects of ToM have several components such as perspective-taking, understanding false beliefs and understanding that individuals have different beliefs in general based on observable cues and context.

> **1375:** *Anyway, after finishing up opening the presents we found something so hilarious we curled up in a ball together on the floor for what seemed an eternity.*

These individuals shared a mutual understanding of the situation which to them was humorous. This shows that they can infer and attribute the mental state of the other person, which in this case is amusement and joy. This is an example of inferring beliefs.

> **3434:** *We end up walking around the lake…. We see a lone fisherman; who cares if he catches anything. Does he know if there's going to be a fish? No. Ignorance is bliss.*

Another example where an individual ascribes mental states to an intentional agent. Specifically, he infers a belief that the fisherman knows if he will catch fish. This relates to the perspective-taking element of the cognitive aspect of ToM. It allows individuals to mentally step into the shoes of others, understanding their thoughts and viewpoints.

> **4648:** *Now we just needed a way to go get everything...so as always I called my grandmother and asked her for a ride to B's house so we could pick him up, get the stuff, and head back to S's house (of course she didn't know what was really going on).*

The individual writes about the mental state of his grandmother. They show an understanding that individuals have different beliefs due to the information they provide to their grandmother.

Affective

Affective components of ToM serve for navigating social environments, forming and maintaining relationships, and developing social competence. They enable individuals to respond appropriately to social cues and create positive interpersonal interactions by responding to emotions of themselves or others. These components are emotion recognition, empathy, hidden emotions, and desires.

> **2270:** *I realized I really loved my girlfriend, that she was kind of oppressed and that the world needed to release her from her pod (like a blooming flower). I then proceeded to see that happen in my mind.*

By having an emotional reaction, the boyfriend used his own mind to mimic or "model" his girlfriend's mind, thereby determining what has or will transpire within her. He shows empathy, an element of the affective aspect of ToM, towards his girlfriend.

> **5664:** *I went back downstairs and saw my boyfriend on the couch. I had to tell him about what I was experiencing but as soon as I got close to him I had to hug him, I felt so attracted to his spirit, he felt so pure and I could just tell he was a genuinely good person with so much happiness in him. I just kept telling him "I feel so strongly towards you" over and over again.*

Although the individual attributes positive traits to her boyfriend which is a cognitive aspect, her emotions are at the forefront here. Empathy allows for deeper insight into how the experiences described resonate emotionally with both the individual and those around them.

Common aspects of Theory of Mind in the context of these reports of psychedelic experiences involve typical cognitive processes, such as recognizing that others have different beliefs and knowledge. On the affective side, individuals often maintain the ability to understand and respond to familiar emotions in themselves and others, showing empathy and emotional recognition. These examples show both cognitive and affective elements of Theory of Mind as they would function in non-altered states. Two previously defined codes were not found in the "Common" broad code, "access to knowledge" and "hidden emotion". This may be due to the way these reports were written on the website where the individual started their story either shortly before the consumption of the psychedelic or at the moment of consumption. This format of reporting hindered the amount of common ToM interactions between an individual and an intentional agent.

Broad Code 2: Uncommon

This broad code delves into the more unusual instances of ToM between an individual and an animal, inanimate object, or an intentional agent but in an uncommon way. Instances where the individual's cognitive or affective reaction is not commonplace in the expected Theory of Mind interactions such as ascribing beliefs to animals or feeling empathy towards inanimate objects, these uncommon instances of ToM could be due to the psychedelic experience. Like in the first broad code, two sub-codes were defined before the coding process, Affective and Cognitive. Affective refers to Theory of Mind components such as emotions, empathy, and hidden emotions. Cognitive, on the other hand, refers to Theory of Mind components such as true and false beliefs, access to knowledge, and perspective taking.

Cognitive

The uncommon cognitive aspects of ToM during psychedelic experiences, as described previously, involve several key components such as perspective-taking, understanding false beliefs, and recognizing that others have different beliefs based on observable cues and context.

> **1375:** *At one point we were convinced that the people on the TV were talking to us. They were telling us that drugs were bad and going on and on about the long-term effects of them. The whole time everything I looked at was moving. Some of it was very overwhelming. But, for the most part, it was the most awesome experience I have ever had.*
>
> **5420:** *…this part of the trip was a struggle as I stopped talking to others in the room and my thoughts virtually took over communication, people on TV were laughing at me saying that I was a fool to have come here and that they would drive me mad before I left as a punishment of venturing into their domain.*

In both reports, there is a cognitive distortion where TV characters are perceived as communicating directly with the individuals. Psychedelics have blurred the boundary between receiving information from the media and personal interaction. These are examples of perspective-taking but with TV characters leading to the belief that the TV characters are actively engaging with the viewer. Such experiences indicate how psychedelics can alter typical boundaries of social cognition, extending perspective-taking to inanimate entities like TV characters, which are not usually perceived as intentional agents.

3191: *It was late autumn, and I looked outside at the trees outback. I could soon see the branches weren't just growing; they were reaching to the heavens rejoicing in life, sharing their happiness, and exalting in God.*

7043: *I could hear in the distance wolves howling and when my attention was on them I could sense restlessness and fighting amongst them. My attention was so concentrated at the time.*

7043: *What is also interesting is since I was in a forest I could sense the curiousness of the animal's minds around me, I couldn't understand them I just knew that they were curious as to what was happening.*

In all three reports, the individual attributes complex mental states and emotions to non-human entities (trees and animals). This involves perceiving inanimate objects and animals as having human-like intentions and beliefs. The reports show individuals' understanding of different beliefs, but with uncommon subjects due to the influence of psychedelic mushrooms.

5346: *We completely lost Ben to the shroom gods- he was just lying on his bed with his eyes closed twitching every once and a while. When me or Diz would shake him, he'd sit up wide-eyed and look around, mumbling usually something we couldn't make out before falling back into his pillow.*

7043: *I then measured the balance of mental purity of all people on earth. I sensed and felt that there were a handful of people who were truly trying to purify their thoughts and the remaining were struggling with pain and sorrow and misguided thoughts. This overwhelmed me and the feeling was intense.*

In these reports, the individuals infer mental states from external behaviors or subjective perceptions. For Ben (5346), this involves interpreting physical reactions in order to ascribe beliefs, while for the global population (7043), it involves perceiving people's access to knowledge on a large scale and assessing mental purity and struggle based on an intuitive sense.

Affective

The affective aspects of ToM experiences are explored to understand how psychedelic substances influence emotional processing and empathy. The following analysis is based on reports of psychedelic experiences where individuals expressed profound emotional connections with other people or with inanimate objects and elements of nature.

> **1554:** *This is when I realized that I was really tripping. I begged and pleaded for him to take me to the hospital but he refused saying, relax and enjoy it. I was freaked out by how he was so relaxed.*
>
> **5420:** *I see my bro in law playing with the gas bottles as he is still trying to work the BBQ, the site of him high and not knowing what will happen forces me to stumble into the house and warn my sister of my fears of him blowing us up. She calms me but I can't let go of the thought of being blown up, so I tell my sister I want my trip to end now and ask to be taken to the hospital, I can now hear my bro in law laughing and I start to laugh as well which calms me back down and I reconsider my urge to see a doctor and brush it off.*
>
> **5420:** *I have the urge to be around people so I venture back into the house only to feel total disconnection to everyone In there, my sister my wife my nephews, all seem like a movie and am directing it, but it's no fun, as I struggle to chain my*

> *words of sanity they end up coming out alien sounding, I guess the look on my face made them all break out in laughter including my bro in law who is also tripping, there laughter insured my triply mind that they were all fake and my life was fake*

These examples show more intense affective reactions between an individual and an intentional agent that were amplified by the psychedelic experience, thus making the whole reaction atypical. In a common, sober setting, an individual would not be "freaked out" by someone's relaxed state like they did in 1554. This constitutes the emotion element of the affective sub-code.

> **4142:** *We decided to walk under the pine tree to investigate what it was up to. The tree looked like it was crying so I gave it a hug...I felt so bad for the tree...*

> **4958:** *I sat down on the bench and we started talking about where we were going to climb the next day, but I was slightly distracted by an Indian face in the clouds. The possibility that there was a person next to me vanished as the voice began to come from the Indian (let's call him Bob). So anyway, Bob wanted to take me on a river rafting trip through the clouds. I complained that I was inappropriately dressed, but he made me strip to my shorts and it felt so gooood...*

Individuals also ascribed hidden affective states or desires to nature. In report 4142, the individual felt compelled to comfort a crying tree, indicating an extension of empathy beyond typical social boundaries, whereas in report 4958 a cloud named Bob wanted to take the individual on a river rafting trip. Both individuals felt a strong affective connection to these entities by feeling empathy towards a tree and then hugging it or by immediately trusting the newly formed entity on the clouds.

> **4958:** *This was when I must have gone insane because I faintly remember cursing at my clothes for causing all the problems of mankind. I threw them as far as I could, but then I thought about my shorts (a loose pair of dirty, brown Gramicci's) and I concluded that they were a real part of my body like my skin, and I loved them more than anything else in the world*
>
> **6421:** *I TAKE OFF RUNNING FULL SPEED IN THE OTHER DIRECTION. Cutting corners and tripping over rocks as I look back to see if "IT" is still behind me. The confusion has now turned to fear and the houses that are painted blue seem to mock me!*

In 4958, the individual experiences intense emotions ranging from anger to affection towards their clothes. These extreme affective responses to an inanimate object, such as attributing global problems to a pair of shorts and developing an intense affection for their shorts, indicate unusual affective processing. This suggests a breakdown in typical cognitive and affective boundaries, where inanimate objects are imbued with exaggerated significance and affective weight. This affective projection can also be observed in 6421, where the individual's fears and paranoia are projected onto the houses.

One previously defined code was not found in the "Uncommon" broad code, "false beliefs". This may be due to the heightened feeling of interconnectedness where individuals constantly feel "in tune" with their surroundings, thus making the possibility of recognizing that someone might have a mistaken belief about a situation or object less likely to happen.

Out of the 50 analyzed interviews, there were 20 instances of uncommon Theory of Mind (7 cognitive, 13 affective) and 5 instances of common ToM.

4. Discussion

This study explored the relationship between Theory of mind and the psychedelic experience by analyzing self-reports of psychedelic experiences from Shroomery website. The aim was to explore whether individuals who were under the influence of psychedelics experienced Theory of Mind in an unusual manner, be it towards uncommon agents such as animals, inanimate objects or towards other individuals but in an atypical way. The lack of common ToM was most likely due to the reports beginning with the individual consuming the psychedelic, thus immediately being in an altered state of perception. The study identified common ToM experiences involving an individual and an intentional agent. The analysis of the reports revealed that psychedelic experiences may influence both cognitive and affective components of Theory of Mind. The findings suggest that psychedelics can enhance empathy and emotional understanding, while also inducing cognitive distortions that affect the perception of others' intentions and beliefs. The cognitive aspects highlighted participants' abilities to infer and attribute mental states such as beliefs, false beliefs, access to knowledge, and perspective-taking to others. The affective aspects of ToM were evidenced by individuals' empathy and affective recognition towards others. A heightened state of empathy is indicative of the enhanced emotional sensitivity that psychedelics can induce. Uncommon ToM experiences were those that were particularly enhanced under the influence of psychedelics, leading to unique cognitive and affective perceptions. For example, individuals described trees exhibiting human-like qualities such as rejoicing and exalting, reflecting an unusual attribution of intentional states to nature. On the affective side, individuals displayed empathetic responses to nature as well. The interplay between cognitive and affective

ToM during psychedelic experiences suggests a relationship where alterations in one aspect can influence the other. For example, the cognitive distortions experienced where users misinterpreted the intentions and communications of TV characters were closely tied to their emotional responses. The perceived negative intentions of the TV characters led to heightened emotional distress, demonstrating how cognitive ToM distortions can directly impact affective ToM, resulting in a feedback loop of fear and paranoia. The findings could suggest that psychedelics can enhance or alter both cognitive and affective components of ToM, extending them beyond typical human interactions. The extended attribution of intentionality to non-human entities suggests that psychedelics can broaden one's perspective on consciousness and intentionality, possibly creating a deeper sense of interconnectedness with the environment. This deep sense of interconnectedness may be the reason for the lack of false beliefs inferred during psychedelic experiences. The same feeling of interconnectedness may also be the reason for the prevalence of strong emotional and empathetic reactions in individuals as well as the ability to take the perspective of uncommon intentional agents such as TV characters. The observed effects can be attributed to the unique way psychedelics interact with the brain's serotonin system, as well as their ability to disrupt normal patterns of brain activity, particularly within the DMN (Soares et al. 2023). The enhanced neural connectivity and reduced filtering of sensory information likely contributed to the cognitive distortions observed, while the increased emotional sensitivity resulted from heightened activity in brain regions responsible for processing emotions. These effects may also be influenced by individual differences, such as previous psychedelic experience or psychological resilience. A person who experienced psychedelics before may be more aware of their effects, thus making it easier for them to concentrate on specific elements of the "trip" such as the emotional sensitivity or cognitive distortions. Psychological resilience can also play an important role; individuals with

higher resilience may be better equipped to manage challenging or intense experiences, reducing the likelihood of negative psychological reactions and promoting positive outcomes such as personal growth or emotional healing. The context in which the drug is taken (set and setting) may also play an important role. For instance, a supportive environment might enhance the positive aspects of affective ToM, while a stressful or chaotic environment could exacerbate cognitive distortions and negative emotional responses. The affective insights gained from psychedelic experiences could be useful in a therapeutic setting to help individuals understand and experience their emotions more deeply. For instance, the ability of psychedelics to enhance empathy and perspective-taking could be harnessed in therapies aimed at improving interpersonal relationships, while the risks of cognitive distortions emphasize the need for careful screening and guidance in therapeutic settings. The emphasized affective ToM observed in some individuals during psychedelic experiences could be useful in a therapeutic setting to improve empathy and emotional understanding, which may be beneficial in improving interpersonal relationships giving an individual a deeper understanding of their social relationships. Additionally, the heightened affective ToM may be useful in trauma therapy where processing deep emotions is pivotal. The unusual manifestations of Tom during psychedelic experiences (e.g. seeing intentionality in nature) might help individuals reconnect with the world around them. This is important in therapies designed to treat conditions like depression where feelings of disconnection are common (Sorajjakool et al., 2008).

Limitations

This study has several limitations that should be addressed in future research. This study utilized self-reports as a base for drawing conclusions which exposes it to several limitations, one of them

being the fact that self-reports can be somewhat unreliable due to various biases such as participants exaggerating or misinterpreting their experiences. However, for now, self-reports might be the best option for understanding psychedelic experience because it allows the person to explain in their own words what they felt revealing the subjectivity and individuality of such a phenomenon. No two people will experience psychedelics in the same way because they are a reflection of each individuals affective and cognitive states (Kuypers, 2019). The problem with self-reports in the context of gathering information from a website dedicated for reports of psychedelic experiences is that individuals may emphasize some elements of their experience in order to gain more popularity on the site. Having a controlled, non-public setting for these self-reports may lower the chance of this bias. Additionally, the researcher was not given access to the website Erowid, which has a bit more regulation on what can be posted on the site, thus it may have more accurate descriptions of psychedelic experiences. The reports on Shroomery do not have any demographic information on the individuals apart from their gender and age (if they chose to report it), which hinders the ability for the results to be representative of the general population. Another limitation is the unstructured way these reports are written. Without any questions to lead the participant to mention instances where ToM could be observed, some reports were mainly based on the visual aspect of the experience, not the affective.

Future Research

Other than the meta-analysis conducted by Soares et al. in 2023, which investigated unrelated studies about psychedelics and Theory of Mind in an attempt to find commonalities between them, no other study investigated the relationship between psychedelics and Theory of mind directly, making this one of the first studies on the topic. Future research should aim to create a controlled

environment where each participant gives their self-report, preferably through semi-structured interviews so participants could be guided into mentioning instances where ToM could be observed as well as allow the interviewer to explore different aspects of their experience that may be notable. Focus groups can also be useful in researching the connection between ToM and psychedelics because they facilitate the exploration of subjective experiences in a social context. By encouraging participants to share and discuss their experiences with psychedelics, researchers can observe how these substances might affect the understanding of others' thoughts, emotions, and intentions in real time. The group setting also allows for shared themes and patterns to emerge, providing richer data and insights into how psychedelics may alter social cognition and empathy. Longitudinal studies could be beneficial for this topic as well to determine whether the ability to experience uncommon Theory of Mind persists after the psychedelic experience. Additionally, collecting more detailed demographic information from participants such as cultural, psychological and biological factors may give insight into how these factors contribute to ToM experiences under the influence of psychedelics. Another interesting direction of research would be to investigate whether mirror neurons activate when a person is experiencing Theory of Mind towards uncommon entities such as nature, animals, and objects. Perhaps by observing brain region activation during these instances. The findings may further solidify the intensity of these emotional reactions if they show that people experience the emotions they attribute to uncommon subjects.

5. Conclusion

This study provided one of the few insights into how psychedelic experiences can influence Theory of Mind by enhancing both cognitive and affective components, extending them to non-human entities and uncommon scenarios. The findings suggested that while some users experience heightened empathy and interconnectedness, others encounter cognitive distortions where non-human agents or inanimate objects, such as TV characters, are perceived as intentional beings, while some individuals experienced both cognitive distortions and heightened empathy and interconnectedness. These insights contribute to a deeper understanding of how altered states of consciousness can impact social cognition, particularly the mechanisms underlying perspective-taking and emotional understanding. These findings open up possibilities for further research into the long-term effects of psychedelics on social cognition. The implications are broad, ranging from potential clinical applications to the ethical considerations of using psychedelics in therapeutic contexts. Addressing the limitations through more controlled designs and diverse sample populations will be important in advancing our understanding of the relationship between psychedelics and Theory of Mind.

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7. Abstract

This is one of the first studies that explores descriptions of cognitive and affective aspects of Theory of Mind (ToM) in reports about psychedelic experiences with psilocybin. Using a qualitative approach, reports of psychedelic experiences were analyzed to identify how users' perceptions of others' beliefs, and emotions during psychedelic experiences are compared to the knowledge about typical ToM. The results revealed that psychedelics can distort cognitive ToM, leading to misinterpretations of reality, such as believing that inanimate objects or media characters possess intentionality. Affective ToM was also impacted, with some users experiencing heightened empathy, while others faced overwhelming emotional responses. These findings suggest a complex interplay between cognitive and affective ToM during psychedelic experiences, highlighting the potential therapeutic benefits as well as risks associated with the use of psychedelics. The study underscores the need for further research to better understand these effects, particularly in controlled therapeutic settings.

Keywords: Theory of Mind, psychedelics, cognitive ToM, affective ToM, empathy, cognitive distortions

Sažetak

Ovo je jedna od prvih studija koja istražuje opise kognitivnih i afektivnih aspekata teorije uma u izvještajima o psihodeličnim iskustvima s psilocibinom. Koristeći kvalitativni pristup, analizirani su izvještaji o psihodeličnim iskustvima kako bi se identificiralo na koji način korisnici percipiraju vjerovanja i emocije drugih osoba tijekom psihodeličnih iskustava u usporedbi sa znanjima o tipičnoj Teoriji uma. Rezultati su otkrili da psihodelici mogu iskriviti kognitivni Teoriju uma, što dovodi do pogrešnih interpretacija stvarnosti, poput vjerovanja da neživi objekti ili medijski likovi posjeduju intencionalnost. Također je utjecalo na afektivni dio Teorije uma, pri čemu su neki korisnici doživjeli povećanu empatiju, dok su se drugi suočili sa snažnim emocionalnim reakcijama. Ovi rezultati upućuju na složenu povezanost kognitivne i afektivne Teorije uma tijekom psihodeličnih iskustava, ističući potencijalne terapeutske koristi kao i rizike povezane s upotrebom psihodelika. Studija naglašava potrebu za daljnjim istraživanjima kako bi se bolje razumjeli ovi učinci, osobito u kontroliranim terapijskim uvjetima.

Ključne riječi: Teorija uma, psihodelici, kognitivna Teorija uma, afektivna Teorija uma, empatija, kognitivne distorzije

8. Appendix A

Quotes for each of the sub-codes (Cognitive and Affective)

Broad Code 1: Common

Cognitive

1375: Anyway, after finishing up opening the presents we found something so hilarious we curled up in a ball together on the floor for what seemed an eternity.

3434: We end up walking around the lake…. We see a lone fisherman; who cares if he catches anything. Does he know if there's going to be a fish? No. Ignorance is bliss.

4648: Now we just needed a way to go get everything...so as always I called my grandmother and asked her for a ride to B's house so we could pick him up, get the stuff, and head back to S's house (of course she didn't know what was really going on).

Affective

2270: I realized I really loved my girlfriend, that she was kind of oppressed and that the world needed to release her from her pod (like a blooming flower). I then proceeded to see that happen in my mind.

5664: I went back downstairs and saw my boyfriend on the couch. I had to tell him about what I was experiencing but as soon as I got close to him I had to hug him, I felt so attracted to his spirit, he felt so pure and I could just tell he was a genuinely good person with so much happiness in him. I just kept telling him "I feel so strongly towards you" over and over again.

Broad Code 2: Uncommon

Cognitive

1375: At one point we were convinced that the people on the TV were talking to us. They were telling us that drugs were bad and going on and on about the long-term effects of them. The whole time everything I looked at was moving. Some of it was very overwhelming. But, for the most part, it was the most awesome experience I have ever had.

5420: …this part of the trip was a struggle as I stopped talking to others in the room and my thoughts virtually took over communication, people on TV were laughing at me saying that I was a fool to have come here and that they would drive me mad before I left as a punishment of venturing into their domain.

3191: It was late autumn, and I looked outside at the trees outback. I could soon see the branches weren't just growing; they were reaching to the heavens rejoicing in life, sharing their happiness, and exalting in God.

7043: I could hear in the distance wolves howling and when my attention was on them I could sense restlessness and fighting amongst them. My attention was so concentrated at the time.

7043: What is also interesting is since I was in a forest I could sense the curiousness of the animal's minds around me, I couldn't understand them I just knew that they were curious as to what was happening.

5346: We completely lost Ben to the shroom gods- he was just lying on his bed with his eyes closed twitching every once and a while. When me or Diz would shake him, he'd sit up wide-eyed and look around, mumbling usually something we couldn't make out before falling back into his pillow.

7043: I then measured the balance of mental purity of all people on earth. I sensed and felt that there were a handful of people who were truly trying to purify their thoughts and the remaining were struggling with pain and sorrow and misguided thoughts. This overwhelmed me and the feeling was intense.

Affective

1554: This is when I realized that I was really tripping. I begged and pleaded for him to take me to the hospital but he refused saying, relax and enjoy it. I was freaked out by how he was so relaxed.

5420: I see my bro in law playing with the gas bottles as he is still trying to work the BBQ, the site of him high and not knowing what will happen forces me to stumble into the house and warn my sister of my fears of him blowing us up. She calms me but I can't let go of the thought of being blown up, so I tell my sister I

want my trip to end now and ask to be taken to the hospital, I can now hear my bro in law laughing and I start to laugh as well which calms me back down and I reconsider my urge to see a doctor and brush it off.

5420: I have the urge to be around people so I venture back into the house only to feel total disconnection to everyone In there, my sister my wife my nephews, all seem like a movie and am directing it, but it's no fun, as I struggle to chain my words of sanity they end up coming out alien sounding, I guess the look on my face made them all break out in laughter including my bro in law who is also tripping, there laughter insured my triply mind that they were all fake and my life was fake

4142: We decided to walk under the pine tree to investigate what it was up to. The tree looked like it was crying so I gave it a hug...I felt so bad for the tree...

4958: I sat down on the bench and we started talking about where we were going to climb the next day, but I was slightly distracted by an Indian face in the clouds. The possibility that there was a person next to me vanished as the voice began to come from the Indian (let's call him Bob). So anyway, Bob wanted to take me on a river rafting trip through the clouds. I complained that I was inappropriately dressed, but he made me strip to my shorts and it felt so gooood...

4958: This was when I must have gone insane because I faintly remember cursing at my clothes for causing all the problems of mankind. I threw them as far as I could, but then I thought about my shorts (a loose pair of dirty, brown Gramicci's) and I concluded that they were a real part of my body like my skin, and I loved them more than anything else in the world

6421: I TAKE OFF RUNNING FULL SPEED IN THE OTHER DIRECTION. Cutting corners and tripping over rocks as I look back to see if "IT" is still behind me. The confusion has now turned to fear and the houses that are painted blue seem to mock me!

9. Appendix B

Standards for Reporting Qualitative Research (SRQR)*

http://www.equator-network.org/reporting-guidelines/srqr/

	Page/line no(s).
Title and abstract	
Title - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	1
Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	43
Introduction	
Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	4
Purpose or research question - Purpose of the study and specific objectives or questions	18
Methods	
Qualitative approach and research paradigm - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale**	19
Researcher characteristics and reflexivity - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability	19
Context - Setting/site and salient contextual factors; rationale**	20
Sampling strategy - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale**	19
Ethical issues pertaining to human subjects - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	/
Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**	20

Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	20
Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	20
Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	20
Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	20
Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	/

Results/findings

Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	22
Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	23

Discussion

Integration with prior work, implications, transferability, and contribution(s) to the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	32
Limitations - Trustworthiness and limitations of findings	34

Other

Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	/
Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	/

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

Form A.

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Thesis Supervisor (first and last name, academic degree and title)

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Committee members (first and last name, academic degree and title):

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