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Exploring Moral Bio-enhancement through Psilocybin-Facilitated Prosocial Effects

Victor Lange
University of Copenhagen

Sidsel Marie
University of Copenhagen

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Biographies
Victor Lange is a PhD-fellow at the Section for Philosophy and the Centre for Neuroscience at the University of Copenhagen. His PhD-project investigates person-level metacognitive control, as it is studied in clinical and performance psychology, with a perspective on the philosophical dimensions of agency, attention, and introspection. He has previously done research in bioethics (also at the University of Copenhagen). In addition, he currently works as a meditation teacher and editor at the platform Regnfang.

Sidsel Marie is a master-student at the Department for Anthropology at the University of Copenhagen. Her work investigates integration of psychedelic experiences into everyday-life among Danish psychedelic users, with a particular focus on the involved social dynamics. Sidsel Marie is further editor and yoga and meditation teacher at the platform Regnfang.

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Exploring Moral Bio-enhancement through Psilocybin-Facilitated Prosocial Effects

Victor Lange and Sidsel Marie

Abstract

The idea of moral bio-enhancement has received considerable philosophical attention in the last 10 years. Yet, it has been extremely difficult to come up with plausible and feasible procedures for how to perform such enhancement. The purpose of this paper is to explore whether the psychedelic compound psilocybin, due to its prosocial effects, can be used for moral bio-enhancement. The first part of the paper is conceptual. This part investigates the term 'prosociality', relates it to philosophical discussions of moral bio-enhancement, and presents a set of necessary conditions for when increases in prosociality can count as moral enhancement. The second part of the paper reviews the empirical literature on the prosocial effects of psilocybin. This part proposes that the prosocial effects of psilocybin likely satisfy the above-mentioned set of six necessary conditions. The paper hereby proposes that we have reason to be tentatively and moderately optimistic about using psilocybin for moral bio-enhancement and that this use of psilocybin is worth future research attention. Nonetheless, the paper ends by stressing that both further philosophical and empirical research is crucial for making stronger conclusions on this matter. The last section of the paper suggests a set of outstanding research questions that should be targeted in such future research.

Keywords

Moral Bio-enhancement, Prosociality, Psilocybin, Psychedelics

1. Introduction

The term 'moral bio-enhancement' refers to the process in which an agent becomes a morally better agent with the assistance of some bio-medical or bio-technological entity (Douglas 2008; Earp 2018). This paper concerns two specialized discussions within the current moral bio-enhancement literature.

First, the paper concerns the discussion on whether moral bio-enhancement could be carried out by making agents more prosocial (Section 2.1 clarifies the term 'prosociality'). The paper offers a new approach to this discussion. By reviewing and structuring the relevant philosophical literature, the paper formulates a set of six necessary conditions that states the boundaries for when an increase in prosociality can count as morally enhancing an agent. This set of conditions is intended to represent the common worries of philosophers on performing moral bio-enhancement through increases in prosociality.

We do not argue for the correctness of this set but formulate it to represent positions held in the philosophical literature.

Second, the paper concerns whether psilocybin (the main psycho-active ingredient in magic mushrooms and psychedelic truffles) could be an appropriate mean for moral bio-enhancement. Other philosophers have already discussed the potential of psilocybin for moral bio-enhancement (Earp 2018; Tennison 2012; see also Haidt 2012). Nonetheless, this paper offers an in-depth analysis of the prosocial effects of psilocybin. The paper does so by applying the framework of the above-mentioned set of six necessary conditions. Such a detailed examination of psilocybin for moral bio-enhancement has not been presented before.

While the main purpose of the paper is to explore these matters, the main claim of the paper is that we have reasons to be tentatively and moderately optimistic about psilocybin for moral bio-enhancement. The paper makes this claim by stressing that the prosocial effects of psilocybin appear to satisfy the set of six necessary conditions mentioned above. Hereby, the paper stresses that the use of psilocybin for moral bio-enhancement is a topic worthy of future research attention.

The structure of the paper is as follows. Section 2 is of a more conceptual nature and offers an introduction to the terms of 'prosociality' and 'moral bio-enhancement'. Most importantly, the section presents the above-mentioned set of six necessary conditions. Section 3 is of a more empirical nature and offers an analysis of the scientific literature on the prosocial effects of psilocybin. This section relates these prosocial effects to the mentioned set of necessary conditions. At last, Section 4 suggests some important research questions for future research on psilocybin for moral bio-enhancement.

To avoid misunderstandings, it is fruitful to stress that the present paper has an explorative nature: its purpose is to explore whether the idea of performing moral bio-enhancement through psilocybin has any initial plausibility. This means that the paper leaves some central philosophical aspects and discussions of moral bio-enhancement and prosociality untouched and unsettled. Further, the paper remains silent about some deeper philosophical questions on moral psychology and moral disagreement. This might be a disappointment to some philosophical readers. This prioritization is fully intended nonetheless. As with any paper, this paper operates under a limited scope. We have given priority to provide a more applied and practical perspective on psilocybin, prosociality, and moral bio-enhancement—hereby, leaving important meta-ethical, normative, and moral psychological topics under-discussed. The literature on moral bio-enhancement is scarce with real feasible and practical proposals on bio-medical substances

or neurotechnologies for moral bio-enhancement. This paper, first and foremost, aims to meet this lack of practical proposals.

2. Prosociality and Moral Bio-enhancement

This section provides an initial and rough clarification of the term 'prosociality'. Importantly, the reader should notice that the purpose of this section is to review and structure the relevant scientific and philosophical literature. The following clarifications are not intended to constitute an independent argument on how to properly understand prosociality and its relation to moral bio-enhancement. Instead, the section aims to adequately represent how the term of 'prosociality' is used across research disciplines. The section furthermore aims to structure the main worries that philosophers have for performing moral bio-enhancement through prosociality. The purpose of this section is hereby primarily to represent the views of different authors, not to evaluate it. We provide this review and structuring of the relevant literatures to build a broad conceptual framework through which Section 3 can evaluate whether psilocybin meets the commonly held worries of the philosophical and bio-ethical community.

2.1 Characterising Prosociality

The term 'prosociality' is used in various research disciplines to characterise individuals' attitudes and behaviour. The most common way to use the term could be outlined as follows:

> *Prosocial attitude*. An agent, A, holds a prosocial attitude towards an individual or a group, G, to the degree that she is motivated to benefiting G.
>
> *Prosocial behaviour*. An agent, A, behaves prosocially towards an individual or group, G, if A's behaviour is driven by a prosocial attitude towards G.[1]

1. In both definitions it is assumed that A and G are non-identical, even though (supposing G is a group) the definitions allow A to be a group-member of G.

Note five things about the above two outlines. First, the definitions are morally neutral and very broad. They make no requirements on specific moral features of the relevant attitudes or behaviour (such as whether the underlying motivation of the attitude or behaviour is genuinely other-concerned). This morally neutral and broad character of the definitions is important to notice, and we shall discuss it further below. Second, the definitions take prosocial attitudes and behaviour to be interpersonal. They are attitudes that are essentially characterised by how an individual approaches or relates to other individuals or groups. Third, according to the above outline, prosocial attitudes come in degrees since the motivational state to benefit some individual or group can come with varying strength. Four, it is important to stress that the expression 'to benefit' should be understood rather broadly in the definitions. Here, 'to benefit' refers to both more economical or material kinds of benefiting (i.e., in which an agent is motivated to distribute resources to benefit some individual or group) and more emotional forms in which a person is motivated to benefit an individual or group through emotional support and relational investment (such as in providing comfort and reconciliation. See: de Waal & van Roosmalen 1979). Of course, both material and more emotional forms of benefitting take various forms, depending upon what the relation that obtains between the agents or groups involved (Clark & Mills 1993, 2012; Clark & Taraban 1991; Earp et al. 2020). We touch further upon this in Section 3 below. Five, it is clear by the above outlines that prosocial behaviour presupposes prosocial attitudes (Twenge et al. 2007).

These two outlines, and the elaboration of them, explicate how the term 'prosociality' is characterised and used in scientific research—involving psychology (Jensen et al. 2014; Zaki & Mitchell 2013; Twenge et al. 2007, 56), evolutionary biology and primatology (de Waal 2006, 2008; Jensen 2016). Further, research on psilocybin (and other psychedelics) also applies this usage (Milliére et al. 2018; Griffiths et al. 2018). More popular characterisations, such as Wikipedia articles, also account for prosociality as done by the two accounts (Wikipedia 2021).

Researchers talk about certain attitudes (or emotion-like states) and kinds of behaviour as being paradigmatic examples of prosociality. Paradigmatic 'prosocial' attitudes and emotion-like states would be empathy, sympathy, trust, a desire for being close to others, and a felt connection to others (de Waal 2006, 2008; Trautwein et al. 2014; Batson 1991). These emotion-like states are seen as reliable indicators of present prosocial attitudes in individuals, or as reliable producers of prosocial attitudes. Examples of paradigmatic types of prosocial behaviour would be different forms of altruism, sharing, and helping (Jensen et al. 2014). These types of behaviour are seen as reliable indicators of an individual holding a prosocial attitude towards the relevant

other individuals or groups. Researchers think that although numerous factors (such as situational issues, lack of will-power in the relevant individual, or other overriding motivational states) might cancel out prosocial behaviour, increasing the degree to which an individual holds prosocial attitudes, toward other individuals or groups, generally makes the individual more prone to behave prosocially towards the relevant individual or group (Zaki & Mitchell 2013; Twenge et al. 2007).

Prosociality is moreover often characterised as a kind of attitude and behaviour opposed to so-called antisocial attitudes and behaviour (Basurto et al. 2016). Antisocial attitudes concern the motivation to disadvantage someone or the indifference to other individuals' well-being if one can gain benefits from exploiting them. Paradigmatic examples of antisocial attitudes of emotion-like states are different instances of aggression, and examples of antisocial behaviour would be violence and unwillingness to cooperate (Hilton et al. 2018). Psychiatric conditions such as psychopathy are associated with antisociality (Neumann et al. 2015). With this in mind, prosociality and antisociality are often seen as two ends on a spectrum, meaning that increase in one of them leads to decrease in the other.

Some readers might find the above characterisation of prosociality to be problematic, however. That is, one might object to the two above outlines by stating that the characterisations are too liberal. One way to explicate this objection would be by presenting the following considerations. Consider the below cases in which a person, A, holds a prosocial attitude and might behave prosocially to an individual or group, G, in the following way:

(a) A is motivated to benefit G but refrains from action (for example due to lack of will-power).

(b) A is motivated to benefit G, but ends up disadvantaging S (for example due to lack of knowledge about how to benefit G).

(c) A is motivated to benefit G and behaves accordingly, but A's attitude and behaviour is strongly socially expected (for example a parent is motivated to benefit her child by providing her food and behaves accordingly).

(d) A is in a given situation motivated to benefit G and behaves accordingly. However, the motivation of A to benefit G is only instrumental in the sense that A ultimately seeks to benefit herself

(for example A might help G, but only with the intention of gaining a good reputation in the group or committing G to help her later on).

(e) A is motivated to benefit G, though this motivation is of a 'tribal nature'[2], meaning that the members of G are only in-group members to A, and an antisocial attitude towards some out-group members, G*, is associated with A's increased prosocial attitude to G (for example A might intend to benefit G by disadvantaging some out-group members, G*, by acts of violence, punishment, or some other kind of hostility).[3]

The cases (a)-(e) would all count as instances of prosocial attitudes and behaviour under the definitions given above. This might lead the reader to believe that (a)-(e) constitutes a series of counter-examples, since the reader might think that it would not make sense to characterise these as instances as instances of prosociality.

The purpose of this paper is not to defend how the term 'prosociality' is used in contemporary research practice. We can only stress that the two definitions given above correspond fully with how researchers use the term. In accordance with this, researchers would not take case (a)-(e) to show that the common definitions of prosociality are mistaken. Instead, researchers would most probably take these cases to stress two important aspects concerning the term of 'prosociality' (two aspects we have already flagged above). First, they show that the characterisation of 'prosociality' is morally neutral in the sense that it covers instances of attitudes and behaviours of varying moral character (ranging from morally admirable to problematic character). This basic morally neutral nature of prosociality makes its link to morality non-trivial. As we shall see in the following sections, suggesting moral bio-enhancement to work through some increase in prosociality requires that the increase in prosociality meets certain further requirements. Second, and related, (a)-(e) simply show that the characterisation is minimal in the sense that it covers many different kinds of attitudes and behaviour without, in a fine-grained way, differentiating further between them. These implications correspond fully with how 'prosociality' is discussed and used in the scientific literature. Here, 'prosociality' is exactly

2. Such tribal prosociality is closely linked to the term 'parochial altruism'. See Choi & Bowles (2007).

3. For relevant studies of this 'tribal prosociality', see Van Kleef et al. (2012) and De Dreu et al. (2010).

seen as depicting a very large set of different social attitudes and types of behaviour with varying moral dimensions (Penner et al. 2005; Caprara et al. 2012). Prosociality is simply used as a broad term that depicts the fundamental type of social attitude and behaviour of being motivated to benefits others (an attitude and behaviour that can take multiple forms and have various relations to self-interest, reciprocity, and selfless other-concern).

Some readers might still think that such a morally neutral and broad use of the term 'prosociality' seems strange. These readers might think that prosociality is a morally laden term in the sense that acting prosocially is, other things being equal, a kind of morally positive behaviour and always self-less in some minimal sense. Our purpose is not to disqualify such a morally laden use of 'prosociality'. Yet, as mentioned above, this use is not the dominant one in scientific research. Across different research disciplines (such as primatology, evolutionary biology, social psychology, etc.), prosociality is a very broad term that depicts behaviour proximally caused by an attitude to benefit another individual or group—without implying anything on further morally relevant features of such attitudes and behaviour. The idea behind operating with such a broad term as 'prosociality' is basically to understand the multiple causes and multi-dimensional nature of the attitude and behaviour of proximally intending to benefit others.

2.2 Moral Bio-enhancement through Prosociality

In the following sections, we shall by the expression 'moral bio-enhancement' mean the following (see also Earp et al. 2017, 168):

> Any change in a moral agent, A, effected or facilitated in some significant way by the application of a biotechnology (e.g., bio-medical substances or neurotechnologies), that results, or is reasonably expected to result, in A being a morally better agent.

As it simply stands, this account is obviously under-specified in one important aspect: namely, the aspects of what it means that an individual becomes a morally better agent (or what it basically means to be a morally good agent).[4] There is deep philosophical

4. Some readers might think that this account is unfair to consequentialistic perspectives on moral bio-enhancement. Under such perspectives moral bio-enhancement is merely oriented around the consequences of action, meaning that moral bio-enhancement is basically the processes of increasing the degree or probability of agents to act such that their actions have morally better consequences. Yet, notice that we do not propose this account to be *the* correct understanding of moral bio-enhancement generally.

controversy around what fundamentally characterises a morally good agent. This was already a controversial topic among ancient Greek philosophers, and the disagreement still pertains between major moral theories such as different versions of consequentialism, Kantianism, and virtue ethics (Homiak 2019; see also Miller 2020). Further, religious moral doctrines, such as that of Catholic ethics, provide characterisations of the morally good person in many ways distinct from those of philosophy (Hare 2019). Given this disagreement, some authors think that the idea of moral bio-enhancement is a dead-end: how can we morally enhance individuals when there is no uncontroversial conception of what this means (Beck 2015)?

Though, philosophers proposing procedures of moral bio-enhancement usually try to tackle this profound disagreement by applying a 'convergence approach'. By this approach, authors propose to increase a given trait or capacity which a majority of the plausible moral theories or systems converge upon as being a morally attractive trait or capacity to increase (Shook 2012; Raus et al. 2014; Ahlskog 2017). For example, authors have proposed to diminish a person's racial prejudiced beliefs (Douglas 2008), increase cognitive capacities and abilities of reasoning (Earp et al. 2017, 170; Shaefer 2015), or strengthen will-power (Shook 2012, 5-6), since multiple moral theories would converge upon viewing such enhancements as morally attractive. As is the topic of this paper, authors have also proposed to perform moral bio-enhancement by making individuals more prosocial (Persson & Savulescu 2012; Earp et al. 2017, 170; Shaefer 2015). The fundamental idea is here that generally increasing the motivation of agents to benefit other individuals or groups likely make these agents morally better.[5] Authors proposing this does not claim any strict or necessary link between prosociality and the moral goodness or character of a person. Instead, they seem to suggest that there is a reliable positive association such that increases in prosociality generally make agents morally better.

We adopt it because it is widely used in the philosophical literature. Further, the account allows for a consequentialist to further specify the moral goodness of an agent purely as a matter of the consequences of her actions.

5. Notice that the link between certain kinds of prosociality and moral enhancement is probabilistic in the above outline (by the qualification 'likely'). This does seem to be an appropriate outline: we know of no authors claiming there to be any strict or necessary link between prosociality and the moral goodness of a person, instead the idea seems to be that there is a reliable positive association.

In Section 2.3 below we discuss the many problems of this idea, but let us initially sketch how one could motivate it.[6] We do not claim that this following motivation constitutes a strong and well-developed argument for this idea of performing moral bio-enhancement through increases in prosociality. The purpose is instead to get some sense of how prosociality could overall be seen as convergence point between different moral systems.

One could stress that concerning normative philosophical moral theories, we could reasonably expect that both different versions of consequentialism (Cummiskey 1989) and virtue ethics (see for example many essays in Walker & Ivanhoe 2007) would find the intuition broadly reasonable (since increasing certain prosocial attitudes might lead to promotion of the general welfare or to instantiating virtues). With regards to more descriptive theories of moral psychology, as Ahlskog also points to (2017, 364), plausible conceptions of the evolution of morality stress that morality essentially involves that individuals take each other's well-being into account and are motivated to benefit it (Boehm 2012, 49; de Waal 2006, 3; Kitcher 2011; Joyce 2007; Jensen et al. 2014). The rationale would be that since our capability for moral cognition is often driven by prosociality (at least to some degree), enhancing this motivation might enhance our moral cognition. Moreover, several religious or spiritual moral theories or doctrines, such as Christian ethics (Gill 2012) and Buddhist ethics (Mosig 1989, 27), often emphasise love and compassion as core moral virtues. One might suggest that these systems would probably also find the intuition intially plausible. Many folk conceptions of morality further stress that the morally good person is characterised by her motivation to benefit other people.[7] With these examples in mind, the idea that moral enhancement could be performed by increases in prosociality does seem to have some broad inter-theoretical and

6. For example, some readers might object that the simple intuition, that increases in prosociality can count as moral enhancement, is deeply implausible merely on the ground that it does not make any requirements on the identity of the individual or group targeted by the increased prosociality. Such readers might point to the example that helping a group in executing unjust violence cannot be morally desirable. This issue will be further discussed in Section 2.3 and 2.4 (see especially the discussion of condition (iii) and (iv)), and especially in Section 3.2. However, it is once again important to stress that we do not outline this intuition simply to defend it. Instead, we outline it to represent a basic idea held by some authors in the philosophical literature. As the following sections show, there are several problems connected to this intuition.

7. See for example how Strohminger and Nichols conceptualise moral character in their seminal study (2014). See also the cross-cultural meta-study on morality by Curry et al. (2019), who argue that cooperation, reciprocity, and interpersonal helping behaviour are considered morally good across cultures.

convergence-based motivation. Examining the route of moral bio-enhancement through prosocial effects appears to have some appeal according to various moral systems—at least from a general perspective.

There are several ways in which one could object to the above idea that moral enhancement can be carried out by increasing prosociality and the motivation for it. Consider the following three objections or worries.

(1) One could simply object that the idea fundamentally misunderstands the nature of morality, since morally right actions and being a morally good person have nothing to do with prosociality. For example, an ethical egoist might very well have much reluctance in accepting the conditional (Regis 1980). Further, a Kantian might think of it as mistaking the nature of morality, since moral actions are not driven by prosocial attitudes but by duty to the moral law and in response to the categorical imperative (Johnson & Cureton 2019). If the reader is sympathetic to the first kind of objection, and does not think that there are some interesting positive relations between prosociality and the moral goodness of an agent, then the following sections will be of limited interest. The plausibility of the further analysis of this paper is conditional upon accepting some positive link between prosociality and moral character.

(2) One might alternatively reply to the above motivation that it is way to abstract and under-specific. One might further state that this would mean that further examination would show that the strength of the above proposed convergence is very weak or perhaps non-existent. That is, critical readers might stress that even though different moral systems (e.g., Christian ethics, Buddhist ethics, virtue ethics, utilitarianism) might all suggest certain ways of prosociality to be morally attractive, these systems diverge in their further specification of what kinds of prosocial attitudes and behaviours that more specifically count as morally attractive. The relevant moral theories and systems likely come to disagree heavily in the light of such specification (e.g., utilitarianism most probably disagree with Christian ethics on the dimensions of prosociality involved in abortion). Hence, the convergence, or 'overlapping consensus', by different moral systems on prosociality is not substantial enough to ground the idea of performing moral bio-enhancement through prosocial effects.[8]

This objection points to a fundamental issue: it questions the theoretical support for considering prosociality at all in relation to moral bio-enhancement. We do not aim to

8. We are grateful to an anonymous reviewer for stressing this issue. For further inspiration and a radical example on how differently prosociality can be morally specified by various moral systems, see Rai & Fiske (2012).

settle this issue (it is clearly a demanding task). Yet, we think the issue can be approached in the following way.

First, the general idea that plausible moral theories and systems can converge has already been discussed in the philosophical literature. Such convergence can take various forms in relation to what the point of convergence is. Some philosophers have proposed that major moral theories converge upon higher-level criteria for the moral right action (Parfit 2011). Other philosophers have proposed that major moral theories converge upon mid-level principles that can guide and justify moral decision-making (Beauchamp & Childress 2001). To be clear, when we suggest that moral systems and theories converge upon prosociality as an appropriate target of moral bio-enhancement, we do not mean that these theories and systems take prosociality as being the fundamental criteria for morally right actions. Instead, we mean that these theories and systems take prosociality as standing in some reliable relationship to the morally right action (although, each system or theory will provide independent explanations of how this relationship more exactly is to be understood). The convergence can hereby be understood as an overlapping consensus on prosociality as a practical mid-level approach to enhancing the moral psychologies of individuals.

Second, we take this 'mid-level convergence' on prosociality to be plausible for the following reasons. To begin with, we think that it is reasonable to overall propose that plausible moral theories and systems all agree that selfishness (implying a general lack of motivation to benefit others) is a general and serious moral problem in the sense that it often hinders individuals in performing the morally right action in real life scenarios. This means that diminishing such selfishness and increasing other-concern is overall a strategy that makes initial sense. Further, even though the moral theories and systems would prioritize different kinds of increases in prosociality and potentially disagree on what specific kinds of prosociality that would count as morally good, we expect that they indeed would agree in a sufficiently large number of cases to ground prosociality as mid-level approach to moral bio-enhancement.

At last, the considerations given in Section 3 will also tackle this above worry on the strength of convergence and overlapping consensus. In Section 3, we outline a set of six necessary conditions stating what character an increase in prosociality of an agent must have, for it to count as moral enhancement of that agent. This set of conditions is based upon a review of the relevant philosophical literature. We think that plausible moral theories and systems will largely agree that if an increase in prosociality satisfies these conditions, then it will very likely count as moral enhancement. This means that even if we are wrong in suggesting that there is broadly an overlapping consensus on

prosociality as a mid-level approach to moral bio-enhancement, it does seem reasonable to suggest that there is an overlapping consensus on particular increases in prosociality that satisfy these six conditions. We think that this consideration, together with the above two, does provide some considerable inter-theoretical motivation to explore moral bio-enhancement through prosocial effects.

The above considerations are clearly speculative and might be unsatisfying to the reader. It is important to re-state the main ambitions of this paper. The main claim of this paper is not that plausible moral theories and systems converge upon prosociality as practical mid-level approach to moral bio-enhancement. Instead, the main claim of the paper is that the prosocial effects of psilocybin appear to satisfy the common philosophical worries against performing such enhancement through increases in prosociality. What we have done above is simply to offer a rough motivation for prosociality as a target for moral bio-enhancement. We do not think that this constitutes any strong conclusions on the discussion on prosociality and moral bio-enhancement, yet we do think that it suggest that the idea of moral bio-enhancement through prosociality deserves further philosophical theorising and that is what we offer below.

(3) At last, one could alternatively present a third objection by stressing that the idea of moral bio-enhancement through prosociality is implausible because the link between prosociality and being a morally good person is much more nuanced and non-trivial than described above. Making this objection one might agree that there is indeed a link between prosociality and morality (contrary to what objection (1) denies). Further, one might also agree that there is a relatively robust convergence from multiple plausible moral theories and systems on prosociality as a practical mid-level approach to moral bio-enhancement (contrary to what objection (2) suggests). Objection (3) denies the idea that increasing prosociality likely results in moral enhancement on the ground that multiple other factors profoundly influence the moral character of such increase. In other words, this objection states that if an individual is to become morally better by an increased motivation to benefit some other individuals or groups, this motivation must satisfy a line of other conditions. It is exactly this objection (3) that the following sections discusses. We elaborate upon it below by reviewing the relevant philosophical literature and outline how different philosophers have formulated this objection.

2.3 Elaboration of Objection (3)

The elaboration of objection (3) has taken multiple forms in the philosophical literature. We suggest dividing these into the four following categories (these relate to the cases (a)-(e) discussed in Section 2.1). Once again, it is important to stress that the purpose of outlining these worries is not to argue that these elaboration or worries are in fact all correct—we do *not* aim to provide such an evaluation of them. Instead, the below outline should be seen as a review and structuring of prominent views in the philosophical literature on the problems on performing moral bio-enhancement through increases in prosociality. This is important to stress to understand the purpose of the following sections. Further, it also emphases that the reader, depending upon her general moral outlook, will probably find some of these worries irrelevant. However, since the below serves the purpose of a review, this will not constitute an argument against the present paper, but against those philosophers advocating these worries.

Philosophers have generally opposed the idea of performing moral bio-enhancement through prosocial effects in three ways. We propose to outline these as follows.

Prosociality as non-exhaustive. Chan and Harris state that making individuals more prosocial cannot count as making them morally better persons since true moral agents do not only perform actions with morally right consequences; they are moreover (reflectively) concerned about what the morally right action is (Chan & Harris 2011). Other philosophers also hold this view (Korsgaard 2006). To truly enhance an individual morally simply requires making that individual more morally reflective.

Even though Chan and Harris do not explicitly state it, we take their concern to relate to another demand requiring that if making an individual more prosocial is to count as making her a morally better person, then the relevant individual must have the right motivation(s) to be prosocial. This relates to empirical work on prosocial behaviour. In research on altruism, it is often stressed that individuals can have both selfish and unselfish motivations for their prosocial attitudes and behaviour (Batson 1991). An individual might be altruistic because it brings her social reward (a selfish motivation concerning for example social reputation and coalition building) or out of genuine unselfish concern of the other individual (a genuine motivation to benefit the well-being of others). One might claim that only the unselfish type seems fit as qualifying for making a person a morally better person.

Prosociality as moral impairment. Another category of warning stresses that being more prosocial might actually hinder you in being a morally good person and prevent you

from doing the morally right thing. Sparrow points to the case that making a judge more emphatic (empathy is taken to be a prosocial state or trait) might hinder the judge in doing the morally right thing (Sparrow 2014). Despite clear and overwhelming evidence, the judge might declare a person non-guilty due to strong emphatic relating and, hence, refrain from doing the morally right thing (judging in accordance with the law and the available evidence).

In addition, Chan and Harris (2011) point to a study by Crockett et al. (2010) in which a group of individuals were administered citalopram (a selective serotonin reuptake inhibitor). Researchers think that citalopram makes individuals more prosocial in certain respects. This prosocially enhanced group showed two tendencies. First, they were less willing to kill one person to save five other persons in a personal moral dilemma task. Second, they were less likely to reject unfair offers in a game called the Ultimatum Game.[9] However, such tendencies may not always be morally desirable. As Chan and Harris (2011) point to, in some real-life situations the morally right thing is indeed to inflict harm (e.g., we may hinder the death of a hundred innocent airplane passengers by harming a terrorist) or to reject and rebel against unfair and unjust transactions (e.g., we should not accept unfair payment and exploitation of workers).

In addition, prosocial effects of other bio-medical drugs might be taken to show morally undesirable effects. For example, studies show that the compound oxytocin facilitates certain tribal or ethnocentric prosocial effects: i.e., the compound appears to make individuals more prosocial to their in-group members, but more anti-social to out-group members (De Dreu et al. 2011; Shalvi & De Dreu 2014. And although these results are controversial in some respects see also Bartz et al 2011; Lane et al. 2015, 2016). Such 'tribal' prosocial effects seem morally problematic in many respects; after all, they occur to affirm ethnic and cultural pre-defined groups and might be viewed as generating racism and other morally undesirable dynamics.

Prosociality as unintelligent. Related to the above considerations, other authors have stressed that making people more prosocial might cause them to become less intelligent. Shook has argued for such: he states that making people more "emphatic, altruistic, or trusting" (all prosocial traits) may make them "dangerous fools, or worse" (2012, 11). This seems relevant. After all, some contexts are simply not fit for prosociality in certain

9. The Ultimatum Game has the following structure. One individual (or a computer) makes an offer to another individual on how to share some sum between them. The individual receiving the offer can either choose to accept the offer (which means that the sum is shared between them according to the offer) or reject it (which means that neither individuals gets any part of the sum).

respects since such attitudes and behaviour would be foolish or naïve (for example, think of an individual being prosocial towards other manipulative and exploitive individuals).

In relation to this, another concern may be that even if contexts are fit for pro-social relating, then they often demand different ways of realising one's prosociality. Think of the difference between being prosocial toward a child who is lost in a supermarket and acting prosocially towards an adult person who has lost a relative; such situations call for different ways of intending to benefit the other individual. Further, consider how situations might develop such that they shift in respect to what way of prosocial relating that is fitting. During only a single evening, at one point in time it may be appropriate to be prosocial to your friend by constructively helping her with her paper and at another time by having caring attitudes toward her. These cases circle around the intuition that if being more prosocial is to be morally desirable, such prosociality has to be flexible and sensitive to contextual factors. This increased prosociality must be intelligent in other words.

2.4 Six Necessary Conditions

For the sake of conceptual clarity, we propose to order the above categories of objections further into a set of six *necessary* conditions stating the boundaries for when an increase in prosociality can count as a moral enhancement. This paper does not argue that this set also constitutes sufficient conditions for morally enhancing an individual through prosociality. This corresponds to the ambition of the main claim of the paper. This claim is not that psilocybin facilitated prosocial effects actually constitutes moral bio-enhancement. Instead, the claim is that psilocybin is worthy future research attention because the prosocial effects, it facilitates, satisfy the common worries in the philosophical literature (as we have expressed them in the following necessary conditions). Again, it is important to stress that this paper does not outline these conditions to argue that they are correct. We outline these conditions to represent popular views in the philosophical literature. More formally we propose to present the challenge against performing moral bio-enhancement through prosocial effects as follows.

> Changing an agent, A, to become more prosocial toward some individual or group, G, (i.e., A has increased motivation to benefit G and is therefore more prone to behave accordingly) counts as morally enhancing A, only if

(i) *Social role*. A does not occupy a social role in which increased paradigmatic prosocial attitudes or behaviour is generally seen as disruptive for properly carrying out that role.

(ii) *Motivation*. A's increased prosociality is, at least partially, based upon a genuine unselfish concern for G—or because A take it, by principle, to be morally correct to be prosocial to G.

(iii) *Reflection*. A has, at some point, exercised sufficient moral reflection in relation to this increase in prosociality towards G; meaning that this increase in prosocial attitude and behaviour has some relevant causal relationship to A's reflection upon what she morally ought to do.

(iv) *Intelligence*. A's increased prosociality to G is sufficiently intelligent.

(v) *Moral traits*. A's increased prosociality to G does not decrease another morally desirable trait of A to an unacceptable degree.

(vi) *Tribalism*. A's increased prosociality to G must not be connected with an improper increased antisocial attitude to members outside of G.

Let us make some general comments on this outline. First, some of these requirements might be overlapping—one might reduce one of them to another (as the following elaboration might show, candidates could be to reduce (ii) to (iii), or (i) to (v)). However, no reduction will be attempted here and we shall discuss each condition separately.

Second, depending on one's general moral outlook, one might think that some of the requirements are irrelevant since they do not rest on any convincing moral consideration(s). Take for example a utilitarian minded person: she would probably find (ii) and (iii) to be only of instrumental importance. Likewise, one might imagine that a Kantian would stress that the only factor determining the moral character of a person is whether she acts out of duty or respect to the moral law (this would make (ii), or the second disjunct in it, the only legitimate condition). This taps into the profound disagreement mentioned in Section 2.3 on what characterises the morally good person. As already mentioned, this paper does *not* take position on which of these conditions that are in fact plausible by further examination (relative to different moral theories and systems). We include them all here to represent the common philosophical worries about

performing moral bio-enhancement through prosociality as comprehensively as possible. Neither do we wish to exclude or favour any particular major moral system by the above set of conditions; we wish to include them all in the set of requirements.

Let us now elaborate on the six requirements individually. Concerning (i), this requirement states that for A to be a morally better person by having increased prosociality to some individual or group, A must not occupy a social role in which paradigmatic prosociality is generally seen as problematic. Following Sparrow (2014), being a judge might be an example of such a role. Depending on the reader's view of the proper function of various roles, she might take specific leader positions, political roles, or military functions likewise to be such social roles in which increased prosociality is generally unfitting.

Concerning (ii), this condition demands that A's increased prosociality to an individual or group must (at least partially) include an unselfish other-concerned motivation or a principle-driven motivation to act prosocially out of the intention to follow some moral rule or principle demanding this. Again, some utilitarian minded people might find this requirement irrelevant. Others, such as psychological egoists, might find it unrealistically demanding (since all behaviour is ultimately selfish according to this view). Yet, based on the review of the previous part, the condition is included here.

In relation to (iii), this requirement demands that A's increased prosociality is manifested in connection to some sufficient level of moral reflection exercised by A herself. This requirement is included to deal with the view, described above, that 'full-bodied' moral agents reflect upon what they morally ought to do (Chan & Harris 2011). This view of what constitutes a moral agent is not easy to translate into a clear formulated condition. Nonetheless, we take one plausible implication of such a view to be the claim that for any prosocial tendency in an agent to count as making that agent a morally better person, this tendency must (at some point in time) have been reflected upon and, in relation, 'reflectively endorsed' by the agent herself. Further, such moral reflection must stand in a causal relationship to the increase in prosociality such that this increase is at least partially caused by the reflection at some point in time. The relevant reflection must simply not be fully post hoc to the prosocial attitude or behaviour. This description should be elaborated upon in the following way.

First, concerning the causal aspect of how the prosocial tendency of the individual arises, we take it to be plausible to read (iii) as stating that the prosocial tendency must either initially arise at least *partially* due to moral reflection; or that if moral reflection plays no causal role in the initial arising of the tendency in the individual, the tendency must be maintained by moral reflection of the individual.

Second, concerning another causal and temporal aspect, we take it to be *too* strong to read (iii) as demanding that: if an act, C, made by an agent, A, in a situation, S, is to count as making A a morally better person, C must be proximately caused by explicit moral reflection exercised by A in S. Take an example: B falls of a ship into the sea under a terrible storm, by 'pure instinct' or 'automatic processes' A jumps into the sea and saves B without any preceding proximate moral reflection. Condition (iii) does not have to deny this action as counting positively in the evaluation of the moral character of A. Instead, it may be more plausible to read (iii) as only demanding that A, at some point in time, must have reflected upon what she morally ought to do and, upon reflection, endorsed the view that one morally ought to risk one's life to save the lives of other people in some situations (or a similar view). This distant reflection should then play some more ultimate causal role and influence an agent's more instinctive behaviour.

Third, concerning the style of moral reflection, one might wonder what (iii) exactly demands. To demand reflection similar to that of academic moral philosophy seems too much; very few humans engage in such a style of reflection. Hence, let (iii) only demand the type of common moral reflection that most people undergo at some point in their lives. We take such reflection to circle, more or less explicitly, around questions such as 'what ought I morally to do?' and 'what is a morally good person?' but without any reliance on philosophical theories.

Requirement (iv) is not easy to flesh out, but the requirement is an incorporation of many of the worries around prosociality as being foolish and unintelligent. As it is simply stated, (iv) demands that the increased prosociality must be intelligent (Earp 2018). By intelligence we generally mean the ability to engage flexibly and context-sensitive with one's surroundings to achieve a goal by executing heterogeneous behaviour and adaptive modifications (this is a common textbook description of intelligence) (for example in Stanford et al. 2017, 410; Wyatt 2017, 57). Following this, the increased prosociality must be regulated through a capacity to engage flexibly with the present circumstances.

Yet, it is still unclear what level of intelligence "sufficiently" refers to in (iv). Since morality is often, if not always, primarily a social matter (in the basic sense that it involves living with others) let us focus on social situations. Thus, let us take 'sufficiently' to refer to the level that a person of average social intelligence operates on in relation to social situations. Such a person can, by a certain accuracy, understand different norms in different communities, register changes in social dynamics, map hierarchies in various settings, observe coalition-building, generate predictions about both the short- and long-term social consequences of an action, and form beliefs with a certain accuracy about the motives, emotions, and personalities of different individuals. Following this, let us say

that (iv) demands the increased prosociality to be processed and regulated through such socially intelligent capacities if it is to count as moral enhancement.

In addition, requirement (v) demands that the increased prosociality must be constituted "without reducing another morally desirable trait of A to any unacceptable degree". This requirement is motivated by the warnings on prosociality as moral impairment. What traits we include as morally desirable, how we measure them, and what "to an unacceptable degree" precisely refers to are questions beyond the scope of this paper. However, it is important to note that (v) does allow for decreasing a morally desirable trait to some degree; something that we might be inclined to do if this decrease is associated with an increase in another morally desirable trait (i.e., we might accept different trade-offs). We will return to (v) in Section 3.2.

Concerning requirement (vi), this condition demands that if an individual's increased prosociality is to count as making her a morally better person, this prosociality must not be tribal of nature meaning that it involves an increased motivation or readiness to disadvantage out-group members. Note, however, that requirement (vi) does allow that an individual's increased prosociality is limited only to her own in-group (i.e., that the relevant individual or group is made up only of in-group members), as long as this does not involve any increased antisocial attitudes to out-group members.

With these conceptual issues clarified, the following Section 3 suggests that the prosocial effects facilitated by psilocybin likely satisfy this set of necessary conditions.

3. Psilocybin and Prosociality

This section discusses the prosocial effects of psilocybin and their relation to the six necessary conditions stated in Section 2.4. When we talk about the 'prosocial effects of psilocybin' we refer to the case that psilocybin increases the prosocial attitudes, and hereby proneness to prosocial behaviour, of individuals. Importantly, this section considers the *lasting* prosocial effects of psilocybin: i.e., the prosocial effects that pertain after the compound of psilocybin is no longer active in the individual. This is to be contrasted with *acute* prosocial effects of psilocybin, which are effects that only occur while psilocybin is directly neurobiologically active in the individual (such acute effects are taken to occur within twenty hours of consumption of psilocybin) (Mason et al. 2019).

Initially, we must stress that it is widely recognized in research that the following three main variables determine the effects of consuming psilocybin and other psychedelic substances (Fadiman 2011; Zinberg 1984; Studerus et al. 2012).[10]

Dosage of specific substance. In general, the psychological effects of psychedelics are dose-dependent (Milliére et al. 2018; Dolder et al. 2016). If we were to carry out moral bio-enhancement by psilocybin we would have to hold precise knowledge of dose-dependent lasting effects of the substance in relation moral cognition.

Set. Another variable is the mind-set, or simply set, of the individual using the substance (Fadiman 2011, 16). The term 'set' encapsulates both the current psychological state (e.g., is the person oriented towards developing her moral character?) and the more standing traits (e.g., is the person generally emphatic?) of the individual consuming the substance. Individuals with different (mind)sets will undergo different changes by consumption of the same dose of psilocybin.

Setting. The term setting refers to the surroundings in which the substance is consumed—these surroundings being both the physical (e.g., is the location warm and inviting?) and the social environment (e.g., is the atmosphere trusting?) (Richards 2015; Carhart-Harris et al. 2018a; Hartogsohn 2016).

Dosage, set, and setting are important for the discussion of this paper for several reasons. First, notice that *no* study has been conducted in which the set and setting was purposely primed or designed to facilitate moral enhancement. With this in mind, we might be optimistic about how a purposefully 'moral enhancement oriented' designed dosage, set, and setting administering could facilitate even bigger and more lasting prosocial effects than current evidence suggests. Second, as researchers often stress, psilocybin 'only' facilitates certain psychological effects, such as prosociality, in an interplay with the set and setting (Richards 2015). The following parts refer to these three variables together as DSS-conditions.

3.1 Lasting Prosocial Effects of Psilocybin

Although there are several interesting studies on the potent acute prosocial effects of psilocybin (Porkorny et al. 2017; Gabay et al. 2018), the following is dedicated to studies touching upon the lasting effects.

10. Psychedelics are typically characterised as serotonin 2A receptor (5-HT_{2A}R) agonists with distinct psychological effects) (Johnson et al. 2019; Carhart-Harris & Nutt 2017; Roseman et al. 2018, 974).

A seminal study by Griffiths et al. (2006) administered 30mg/70kg psilocybin to thirty individuals in a double-blind study. Among many interesting things, the study found that two months after the consumption of psilocybin, participants reported themselves to have had significant positive changes in their mood and behaviour (ascribing it to the psilocybin-experience). Importantly, such effects included a general positive behaviour change, more positive attitudes to oneself and others, and general positive social and altruistic changes. Moreover, community members (e.g., friends or family to the participants) who had regular contact with the participants also reported that the participants had undergone a positive change in behaviour and mood, including a positive social change. Griffiths et al. (2008) further investigated whether these positive effects were present fourteen months after the study and found that most participants (61%) reported that the positive change in mood and behaviour had lasted to a moderate or even extreme degree. Among this lasting positive change, positive social and altruistic changes were present. Further, many of the participants reported that the psilocybin-trip had facilitated insights about love and empathy (these insights are not specified in-depth in the study).

Evidence strongly suggests that the prosocial related effects of psilocybin are dose-dependent. In another study by Griffiths et al. (2011) participants were either given a placebo drug or 5, 10, 20, or 30 mg psilocybin per 70 kg body weight. All participants administered psilocybin reported to have had positive changes in behaviour including positive changes in attitudes to life, altruistic/positive social change, increased empathy, and better connection to other individuals—yet, the effects were most significant by 30mg/70kg administering. These effects were lasting: after fourteen months subjects still reported them to be present. Moreover, once again, reports from community members close to the participants also stressed the positive change in behaviour and mood.

More recent studies cohere with the above results. Agin-Libes et al. (2020) found that psilocybin assisted psychotherapy had positive effects on social behaviour and relationships even 4,5 years after the use (in general, 71-100% of participants reported that the psilocybin assisted therapy had had overall positive life changes lasting this long). In a web-based survey study of 886 subjects who had participated in a psychedelic group session, Kettner et al. (2021) concluded that the psychedelic ingestion in a social setting led to enduring pro-social effects such as increased interpersonal tolerance and social connectedness in the majority of the study-participants.

In a much more limited time scope, Mason et al. (2019) found that psilocybin increased emotional empathy a week after consumption. This picture is affirmed by multiple other recent studies: they affirm that many of the attractive psychological

effects of psilocybin, including prosocial effects, are lasting in multiple months (see for example Griffiths et al. 2018), and even up to multiple years, although individuals might need more than one consumption of psilocybin to gain such effects (Studerus et al. 2011; Erritzoe et al. 2018; MacLean et al 2011; Lerner & Lyvers 2006; van Mulukom et al. 2020).

At last, worth noticing, large population studies show that use of psychedelic substances, for example psilocybin, is associated with decreases in antisocial behaviour such as assaults and partner violence (also when covariates are controlled for) (Hendricks et al. 2018; Thiessen et al. 2018). These studies suggest that psilocybin facilitates such lasting prosocial effects (and decreases antisocial behaviour) by generally increasing the capacity for emotion regulation among individuals (Thiessen et al. 2018; Young 2013, 78). This is interesting since emotion regulation is generally seen as necessary for competent moral cognition and appropriate behaviour (Zhang et al. 2017).

With the above overview in mind, there is a strong case to make that psilocybin, under the appropriate DSS-conditions, facilitates lasting prosocial effects in individuals. Several other authors than us also suggest this (Ahlskog 2017; Earp 2018; Tennison 2012; Haidt 2012, 265; Pollan 2019, 273). It is also very important to stress that the increased prosociality of subjects who consume psilocybin usually has a very broad segment: subjects not only have increased prosocial attitudes to their close relatives, but to human beings in general and even extending to non-human organisms (see for example Griffiths et al. 2006, 2008, 2011, 2018; Studerus et al. 2011; Carhart-Harris et al. 2018b, and for increased concern for non-human organisms and nature as a whole, see Forstmann & Sagioglou 2017; Kettner et al. 2019).

3.2 Examination by the Six Necessary Conditions

While we have no direct evidence to determine whether the prosocial effects facilitated by psilocybin satisfy the six necessary conditions stated above, we can indeed make the following examination.

First, considering (i): it requires that the relevant subject of the moral bio-enhancement does not occupy a specific social role in which an increase in paradigmatic prosociality is generally seen as problematic. Simply selecting a proper subject as target for the enhancement would satisfy this condition.

Recall requirement (ii): it demands that the change to more prosocial relating to other people must have an element of genuine unselfish other-concern. Studies show that around two/thirds of the participants under high-dose psilocybin consumption rank their

experience as either among the five most meaningful or the most meaningful experience of their lives (Griffiths et al. 2006, 276). Likewise, more than 60% of participants in a related study rated the experience to be among the top five spiritual experiences of their lives (Griffiths 2008, 627). Moreover, in another study by Griffiths et al. (2011, 661) participants had likewise profound feelings of unity, sacredness, and connectedness to the world. At last, as already mentioned, many participants under high-dose psilocybin have so-called 'mystical experiences' in which they have a sense of losing their self or ego, and their ego-centric orientation is decreased (Lebedev et al. 2015).[11] In such states, individuals report to feel more connected to themselves, other people, and the world.[12]

With these strong and life-changing experiences of unity, connection, and loss of ego-centric orientation we take it to be reasonable to claim that the prosocial effects of psilocybin do at least partially have a genuine unselfish other-oriented motive of care and concern for other people (a view Gabay et al. (2018, 8236) also support). Participants generally seem to be less egocentrically motivated and more turned towards both their human and non-human surroundings. Moreover, qualitative studies confirm that a greater degree of other-concern is a common result of psilocybin consumption (Belser et al. 2017).

Considering (iii), it demands that "sufficient moral reflection must be connected to the change" in prosociality. Studies do seem to affirm that, under the appropriate DSS-conditions, the prosocial effects of psilocybin can be said to have some moral reflective dimension. Recall that many participants under high-dose of psilocybin—especially those reaching the 'mystical experience'—reported to gain deep insights into their own psychology, the workings of the world, and often philosophical and religious questions such as how one should relate to one's surroundings (Griffiths et al. 2006, 2008, 2011). We think such changes in perspective and the associated increased understanding connect to moral questions on how one ought to live. Further, these changes are generated by highly rich mental activities that draw on memory, emotions, ideals, imperatives, and a broad range of components found in deep thoughtful practice. This idea is supported

11. Importantly, the expressions 'self' and 'ego' are not trivial to specify and they are subject to great controversy both in philosophy and cognitive science. Here, we refer roughly to the conceptualisations of these expressions as done in the Ego-Dissolution Inventory (see: Nour et al. 2016, 269). See also Milliére et al. (2018) for an illuminating discussion of these matters.

12. 'Connectedness' has become a key term in psychedelic science and some authors propose that the general therapeutic effects of psychedelics are always established and mediated by connection of individuals to the relevant surroundings. See Watts et al.(2017) and Carhart-Harris et al. (2018b).

by multiple qualitative studies; they point to the case that psilocybin experiences often involve morally reflective dimensions or examination of one's own values (including values of a moral or ethical character) (see Belser et al. 2017; Watts & Luoma 2020; Watts et al. 2017; Swift et al. 2017; Noorani et al. 2018; Hartogsohn 2018, 129).

Next, consider requirement (iv): it demands that the individual must relate more prosocially to other people in a "sufficiently intelligent way". We think that the two below considerations suggest that psilocybin facilitated prosocial effects do satisfy this requirement.

First, recall the three studies by Griffith et al. (2006, 2008, 2011) from Section 3.1. Participants in all these studies reported that psilocybin, especially under high-dose administering, had made a *general* positive contribution to their behaviour and mental life (an assessment in which community observers agreed). These results seem to suggest a positive relation between psilocybin and general intelligence in relating to themselves and others—this increased intelligence being a lasting effect. At least, the studies do in no way indicate that participants became less competent in general intelligent behaviour.

Second, studies show that psilocybin does increase, as a lasting effect, the general psychological flexibility of individuals (i.e., the ability to navigate adaptively in the present moment) and facilitates that individuals relate cognitively and emotionally less rigidly to their environment (Davis et al. 2020).

With these studies in mind, we think it is reasonable to be optimistic about satisfying (iv): under the right DSS-conditions, psilocybin seems to contribute positively to a person's general cognition and psychological flexibility. This makes sense since psilocybin is thought to work in a holistic way, which means that the effects of this substance are generated by and integrated in the larger general intelligence of the person (Carhart-Harris et al. 2014).

Though, one consideration must be mentioned here. Multiple studies show that psilocybin acutely biases emotion recognition such that it disrupts the ability to recognise negative emotions in other individuals (lysergic acid diethylamide, LSD, has similar effects) (for a review of these effects see Rocha et al. 2019). These results might count against the claim that (iv) is satisfied, since one might take the ability to recognise negative emotions to be crucial for moral competent cognition and behaviour. Though, notice that the disruption of recognition of negative emotions has primarily been shown to be an *acute* effect of psilocybin—whether it is a lasting effect seems to be less clear. Moreover, even if these effects appeared to be lasting, they had to be sufficiently big if they were to count as direct disruptions of the intelligence of the individual.

Further, recall requirement (v): it demands that the increase in prosociality must not reduce "another morally desirable trait of A to any unacceptable degree". To our knowledge, no study can provide us with a satisfying answer to this question. The closest we get are two recent studies. Porkony et al. (2017) investigated whether psilocybin had any *acute* effects on moral decision-making—they found that psilocybin had no significant effects on moral decision-making as measured by moral dilemma tasks. Perhaps more relevant, a study by Gabay et al. (2018) investigated the effects of psilocybin on behaviour in the Ultimatum Game. Except from one participant, all individuals in the psilocybin condition accepted all fair (50% share offered) and hyper-fair offers (80-90% share offered). Concerning unfair offers (20-30% share offered), psilocybin reduced the rejection rate of such offers (i.e., participants in the psilocybin-condition accepted more unfair offers).

Of the results obtained by these studies, only the reduced rejection rate of unfair offers might be understood as evidence for a decrease in a morally desirable trait. As Gabay et al. (2018) discuss, punishing unfair offers by rejection might be understood as altruistic punishment (altruistic punishment being the costly punishment of letting go of own reward to punish a norm violation, here the violation of the norm of fair sharing). Altruistic punishment might be understood as connected to some sense of justice—a sense we would count as a morally desirable trait. With this in mind, one might claim that (v) is not satisfied.

However, even if we accept this understanding of the results, one could reply in the following two ways. First, the mentioned study investigated the *acute* effects of psilocybin on moral decision-making, while the present discussion considers whether the lasting prosocial effects of psilocybin are relevant for moral enhancement. Decreases in altruistic punishment might only be an acute effect of psilocybin.

Second, as an explanation of the reduced rejection in the psilocybin condition, Gabay et al. (2018) propose that this behaviour is caused by an increase in other-concern in individuals in this condition (the explanation being that subjects in the psilocybin condition would not reject unfair offers since this would leave the other participant empty-handed). This increased other-concern might count as a morally desirable trait too, which would imply that we would have to weigh the decrease in 'altruistic punishment dispositions' with the increase in 'other-concern' before making the call that (v) is not satisfied. In such a weighting, we might believe that in relation to many real-world social scenarios a trade-off of having increased other-concern and decreased tendency to altruistic punishment is morally attractive. If we restrict ourselves to only performing moral bio-enhancement through psilocybin on individuals who do *not* hold roles or

positions in institutions in which altruistic punishment is crucial (a matter that really concern condition (i)), we could further justify this reply and weighing.

Though, the above issues shall not be discussed further here. Determining whether (v) is satisfied would demand discussions of what traits were to count as morally desirable, how we are to measure such traits, and what trade-offs to accept. However, since we have seen how psilocybin makes very positive general changes to a person's psychology, we might be optimistic about its contribution to a variety of morally desirable traits too. Also, recall that no study has worked with purposefully designed and primed DSS-conditions for moral bio-enhancement—this might as well fuel optimism about satisfying (v).

Then consider condition (vi): it demands that the relevant person's increased prosocial attitude must not be connected with an increased antisocial attitude to out-group members. Based on the previous mentioned studies, it does seem reasonable to think that the prosocial effects of psilocybin are not of tribal nature. First, as also mentioned in Section 3.1, the target of the increased prosocial attitudes appears very encompassing; meaning that participants have increased prosocial attitudes to human beings in general, and also often even to non-human animals and nature in general (Watts et al. 2017; Carhart-Harris et al. 2018b). Second, no study has reported that psilocybin is associated with increased anti-social tendencies to another individual or group. This absence of evidence is of course not direct evidence for psilocybin not being associated with anti-sociality, but it stresses that psilocybin so far does not have a research record involving anti-sociality.

Yet, some qualitative research indicates that psilocybin *can* generate tribal prosocial effects. As Langlitz (2020) notices, some contemporary far right-wing groups use psychedelics, such as psilocybin, to strengthen in-group prosociality and out-group anti-sociality. Further, Langlitz also points to anthropological studies showing that different Amazonian communities have used psychedelic compounds to increase antisocial and militant attitudes to out-group members (Dobkin de Rios 1984). These are important considerations. However, no contemporary scientific psilocybin study (conducted by researchers and professional clinicians or councillors) has reported that psilocybin facilitates such tribal forms of prosociality. Therefore, it seems reasonable to suggest that tribal forms of psilocybin facilitated prosocial effects, as well as non-tribal forms, are determined by the relevant DSS-conditions (Langlitz (2020) draws the same conclusion). With this in mind, we conclude that requirement (vi) can be satisfied when psilocybin consumption happens under the appropriate DSS-conditions.

With the above examination in mind, we find it reasonable to tentatively and moderately optimistic about the case that psilocybin facilitated prosocial effects, under the appropriate DSS-conditions, will satisfy the six necessary conditions.

3.3 The target of Prosociality

The reader might think that one crucial issue has been neglected in the above sections: namely, the more specific identity of the individual or group being the target of the increased prosociality. The reader might think that the identity of the individual or group is crucially decisive for whether increases in prosociality are morally attractive (e.g., an agent exhibiting prosocial attitudes and behaviour towards groups with suspect or wrong intentions, such as the execution of unjust violence, cannot count positively to the moral goodness of that agent). This issue of identity is obviously relevant and deserves a brief elaboration here.

One way to respond to this worry would be by stressing that the above issue of identity is in fact incorporated in multiple of the above six necessary conditions. For example, condition (iii) demands that moral reflection must play some causal role in the relevant increased prosociality. One could further elaborate upon (iii) by stressing that such moral reflection *must* involve reflections upon what constituted proper targets of prosociality. To satisfy (iii), the agent simply had to substantially reflect upon what individuals and groups she should be motivated to benefit.

Another conditions potentially dealing with the issue of identity would be that of (iv). As the outline and elaboration of condition (iv) stresses, the increase in prosociality must be intelligent in the way that it must be integrated in the agent's general ability of social cognition. One could take this general ability to involve the capacity to competently distinguish between proper and improper targets of prosociality. To satisfy (iv) the agent's increased prosociality had to be integrated into her general ability to distinguish proper from improper targets of benefit.

Last, a third condition dealing with the issue of proper targets of prosociality would be (v). Condition (v) demands that no other moral traits must suffer to an unacceptable degree due to the increase in prosociality. One could argue that this would involve the ability to distinguish proper from improper targets of benefit. One way to further characterise this ability would be to label it as a form of sense of justice (the sense of who deserves benefit). Condition (v) would hereby be taken to implicitly demand that the target of prosociality was not morally improper.

Yet, this implicit treatment of the issue of identity might not satisfy the reader and she might respond that the issue is way too important to be treated in such an implicit manner, by implementing it in the formulations of other conditions. The reader might alternatively stress that adding a seventh conditions to the overall set of necessary conditions is demanded to more explicitly treat the issue of identity. This condition could be formulated as below.

(vii) *Target*. G must be a proper target of prosociality.

The formulation of this condition is obviously under-specified as it stands (e.g., in relation to the morally laden nature of the qualification 'proper'). This paper shall not offer a satisfying specification here. However, as we briefly propose below, there is good reason to overall believe that the targets of psilocybin facilitated prosocial effects can be controlled by DSS-conditions. This suggests that controlling for DSS-conditions enable control of the targets of increased prosociality facilitated by psilocybin. That is, recall from the above paragraphs that studies indicate that psilocybin facilitates both very global prosocial effects (ranging from relatives, to people in general, and even to non-human animals) and tribal prosocial effects involving out-group hostility. As also stressed in Section 3.2, this variance in the targets of prosocial effects strongly suggests that these effects are determined by the operating DSS-conditions. In the light of this, it does seem reasonable to be optimistic about satisfying (vii) by establishing fitting DSS-conditions (e.g., DSS-conditions in which a competent moral councillor or coach was present to guide the change in the moral psychology of the agent). Further, as we have argued above, since the conditions of (iii), (iv), and (vi) all have some important relation to the target of the increased prosociality, satisfying something like condition (vii) would most probably occur in tandem with the satisfaction of many of the other necessary conditions and in general with the appropriate DSS-conditions. Condition (vii) hereby fits very naturally with the content of many of the other conditions and their reliance on DSS-conditions.

4. Further Worries and Research

The optimism about satisfying the set of necessary conditions should however be seen as tentative in various respects. Numerous central issues remain unanswered. Further research on psilocybin for moral bio-enhancement would need to target several questions—questions especially pertaining to the DSS-conditions for moral

bio-enhancement. We think that the following list of questions highlights some of the aspects that needs to be addressed in further discussion of psilocybin for moral bio-enhancement.

(a) How sure are we that psilocybin actually has *real* behavioural and psychological prosocial effects? That is, since the research cited in this article relies so heavily upon self report, could we not simply interpret the results as suggesting that individuals *subjectively feel* more prosocial, without necessarily actually being more prosocial? Future research should navigate this question and aim to unpack the relationship between the subjective feeling and the more objective attribute of being more prosocial. However, as we have referred to in the previous sections, some studies certainly do suggest that individuals do not only feel more prosocial but that they actually also act more prosocially (see for example Section 3.1 and the reports by community observers).

(b) If psilocybin reliably facilitates real prosocial effects, how long-term are these effects? Studies would need to identify the temporal scope of prosocial effects of psilocybin and clarify whether these effects are fading over time and to what degree.

(c) What is the proper dose-frequency: how often and how strong doses of psilocybin should individuals take to generate the relevant prosocial effects? Although many researchers consider psilocybin to be a physiologically safe drug, this question should also consider potential side effects of repeated use (both psychological and physiological).

(d) Should the individual engage in any particular moral practice, like moral deliberation, to influence her mind-set before psilocybin consumption? Since the effects of psilocybin are so sensitive to DSS-conditions, such preparation would most probably be suitable—though, it is not obvious what it should involve.

(e) Under the psilocybin consumption itself, we expect that a councillor (or moral coach or supervisor) should most probably be

present (as in many scientific experimentations on the therapeutic effects of psilocybin) (Griffiths et al. 2018). Should the councillor excite the individual to engage with moral questions? Further, should the councillor in some way be a representative of the individual's moral tradition or system (for example, a priest, rabbi, Lama, imam, or a secular philosopher depending upon the identity of the subject)?

(f) As stressed by many psychedelic therapists, the long-term psychological effects of psychedelic experiences are very sensitive to how the individual integrates the psychedelic experience into her everyday life, and whether the individual has any social or cultural context to make such integration within (Bourzat & Hunter 2019; Eisner 1997; Saunders et al. 2000; Richards 2015, 2017). Hence, one might ask whether moral bio-enhancement by psilocybin should involve follow-up integration initiatives (e.g., exercises of moral deliberation or interviews) to ensure lasting prosocial effects and other morally relevant psychological effects.

Many of these questions stress the importance of DSS-conditions, as this article has generally done. Some readers might wonder whether the dependence upon certain DSS-conditions makes the prosocial effects of psilocybin fragile in the sense that they are so context dependent that unattractive side-effects and other unexpected effects will inevitably occur upon broad use (making psilocybin too risky a bio-medical substance to use for moral bio-enhancement) (Fabiano 2020). This is obviously a reasonable worry and it applies to most, if not all, feasible proposals of a bio-medical or neuro-technological tool for moral bio-enhancement. We offer no general and satisfying answer to this here. We can only refer to the studies outlined in Section 3.1 and stress that under the DSS-conditions applied in scientific research, psilocybin reliably and consistently facilitates prosocial effects of a relatively common character—appearing to avoid unexpected side-effects. This provides hope that controlling for DSS-conditions will yield consistent changes in moral psychologies across individuals, populations, and trials.

A related yet distinct worry would be that seriously proposing psilocybin for moral bio-enhancement demands that one understands the general influence which psilocybin has on the workings of moral cognition (Dubljević & Racine 2017). If we do not understand these workings, we cannot come to know what the appropriate DSS-

conditions exactly are and hence control for them. This worry is also relevant. Though, moral cognition is a topic of great controversy: the literature contains multiple competing models of such cognition and none of them can claim the status of a standard model. Understanding the prosocial effects of psilocybin within these models would undoubtedly be of interest and would without doubt increase our understanding of how to control for the appropriate DSS-conditions. This matter is nevertheless beyond the scope of this paper. We have simply aimed to show that psilocybin, under appropriate DSS-conditions, facilitates prosocial effects that likely satisfy the outlined set of necessary conditions. How this fits into the discussions on the more specific workings of moral cognition and moral psychology is a matter for another occasion.

5. Conclusion

Section 2 of this paper provided a conceptual analysis of the meaning of 'prosociality' (more precisely, prosocial attitudes and behaviour). It further organised the common philosophical worries against performing moral bio-enhancement through prosocial effects into a set of six necessary conditions. Hereafter, Section 3 provided a review of the relevant research results on psilocybin. This section suggested that we have good reason to be tentatively and moderately optimistic about psilocybin, under the appropriate DSS-conditions, satisfying this set of necessary conditions. At last, Section 4 stressed the need for further research on DSS-conditions for moral bio-enhancement through psilocybin facilitated prosocial effects. In the end, this paper can be seen as an attempt to show that psilocybin for moral bio-enhancement is a matter worth of future research attention. Both philosophical and empirical work would be important in such future research. Philosophical work should explore the justification of prosociality as a target of moral bio-enhancement, and further scrutinize the requirements for increases in prosociality to count as moral enhancement. Empirical work should investigate both how psilocybin generally influences moral cognition and the proper DSS-conditions for its potential use in moral bio-enhancement.

References

Agin-Liebes, G. I., Malone, T., Yalch, M. M., Mennenga, S. E., Ponté, K. L., Guss, J., Bossis, A. P., Grigsby, J., Fischer, S., & Ross, S. 2020. "Long-term follow-up of psilocybin-

assisted psychotherapy for psychiatric and existential distress in patients with life-threatening cancer". *Journal of psychopharmacology* 34(2): 155–166

Ahlskog, R. 2017. "Moral Enhancement Should Target Self-Interest and Cognitive Capacity". *Neuroethics* 10: 363-73

Basurto, X., Blanco, E., Nenadovic, M., & Vollan, B. 2016. "Integrating simultaneous prosocial and antisocial behavior into theories of collective action". *Science Advances* 2(3): e1501220

Batson, C. D. 1991. *The altruism question: toward a social- psychological answer*. Hillsdale, NJ: Erlbaum

Batson, C. D., & Shaw, L. L. 1991. "Evidence for altruism: Toward a pluralism of prosocial motives". *Psychological Inquiry* 2: 107–122

Bartz, J.A., Zaki, J., Bolger, N., & Ochsner, K.N. 2011. "Social effects of oxytocin in humans: Context and person matter". *Trends in Cognitive Sciences* 15(7): 301–309

Beauchamp, T. L., & Childress, J. F. 2001. *Principles of biomedical ethics*. Oxford University Press, USA

Beck, B. 2015. "Conceptual and practical problems of moral enhancement". *Bioethics,* 29(4): 233-240

Belser, A. B., Agin-Liebes, G., Swift, T. C., Terrana, S., Devenot, N., Friedman, H. L., Guss, J., Bossis, A., & Ross, S. 2017. "Patient Experiences of Psilocybin-Assisted Psychotherapy: An Interpretative Phenomenological Analysis". *Journal of Humanistic Psychology* 57(4): 354–388

Boehm, C. 2012. *Moral Origins: The Evolution of Virtue, Altruism, and Shame*. New York: Basic Books

Bourzat, F., & Hunter, K. 2019. *Consciousness Medicine: Indigenous Wisdom, Entheogens, and Expanded States of Consciousness for Healing and Growth*. North Atlantic Books;.

Caprara, G. V., Alessandri, G., & Eisenberg, N. 2012. "Prosociality: The contribution of traits, values, and self-efficacy beliefs". *Journal of personality and social psychology*, 102(6): 1289.

Carhart-Harris, R. L., Leech, R., Hellyer, P. J., Shanahan, M., Feilding, A., Tagliazucchi, E., Chialvo, D. R., & Nutt, D. 2014. "The entropic brain: a theory of conscious states informed by neuroimaging research with psychedelic drugs". *Frontiers in human neuroscience* 8(20).

Carhart-Harris, R. L., & Nutt, D. J. 2017. "Serotonin and brain function: a tale of two Receptors". *Journal of psychopharmacology* 31(9): 1091–1120.

Carhart-Harris, R. L., Roseman, L., Haijen, E., Erritzoe, D., Watts, R., Branchi, I., & Kaelen, M. 2018a. "Psychedelics and the essential importance of context". *Journal of psychopharmacology* 32(7): 725–731.

Carhart-Harris, R. L., Erritzoe, D., Haijen, E., Kaelen, M., & Watts, R. 2018b. "Psychedelics and connectedness". *Psychopharmacology* 235(2): 547-550.

Chan, S. & Harris, J. 2011. "Moral enhancement and pro-social behaviour". *Journal of Medical Ethics* 37(3): 130-1..

Choi, J. K., & Bowles, S. 2007. "The coevolution of parochial altruism and war". *Science* 318(5850): 636-640.

Clark, M. S., & Taraban, C. 1991. "Reactions to and willingness to express emotion in communal and exchange relationships". *Journal of Experimental Social Psychology* 27(4): 324-336.

Clark, M. S., & Mills, J. 1993. "The difference between communal and exchange relationships: What it is and is not". *Personality and Social Psychology Bulletin* 19(6): 684-691.

Clark, M. S., & Mills, J. R. 2012. "A theory of communal (and exchange) relationships". In P. A. M. V. Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), Handbook of Theories of Social Psychology: Volume Two: 232-250. SAGE.

Crockett, M. J.; Clark, L., Hauser, M. D., Robbins, T. W. 2010. "Serotonin selectivity influences moral judgement and behaviour through effects on harm aversion". *Proceedings of the National Academy of Sciences of the United States of America* 107(40): pp. 17433-8.

Cummiskey, D. 1989. "Consequentialism, egoism, and the moral law". *Philosophical studies* 57(2): 111-134.

Curry, O. S., Mullins, D. A. & Whitehouse, H. 2019. "Is it good to cooperate? Testing the theory of Morality-as-Cooperation in 60 societies". *Current Anthropology* 60(1): 47-69.

Davis, A. K., Barrett, F. S., & Griffiths, R. R. 2020. "Psychological flexibility mediates the relations between acute psychedelic effects and subjective decreases in depression and anxiety". *Journal of Contextual Behavioral Science 15*: 39-45..

De Dreu, C. K., Greer, L. L., Handgraaf, M. J., Shalvi, S., Van Kleef, G. A., Baas, M., Ten Velden, F. S., Van Dijk, E. & Feith, S. W. 2010. "The neuropeptide oxytocin regulates parochial altruism in intergroup conflict among humans". *Science*, 328(5984): 1408-1411.

De Dreu, C. K., Greer, L. L., Van Kleef, G. A., Shalvi, S., & Handgraaf, M. J. 2011. "Oxytocin promotes human ethnocentrism". *Proceedings of the National Academy of Sciences* 108(4): 1262-1266.

de Waal, F. B., & van Roosmalen, A. 1979. "Reconciliation and consolation among chimpanzees". *Behavioral Ecology and Sociobiology* 5(1): 55-66.

de Waal, F. 2006. "Morally Evolved: Primate Social Instincts, Human Morality, and the Rise and Fall of 'Veneer Theory'". In Macedo, S. & Ober, J. (eds.). *Primates and Philosophers.* Princeton: Princeton University Press: 1-75.

de Waal, F. 2008. "Putting the altruism back into altruism: the evolution of empathy". *Annual review of psychology* 59: 279–300.

Dobkin de Rios, M. 1984. *Hallucinogens: Cross-Cultural Perspectives. Prospect Heights*, Ill.: Waveland Press.

Dolder, P. C., Schmid, Y., Müller, F., Borgwardt, S., Liecht, M. E. 2016. "LSD Acutely Impairs Fear Recognition and Enhances Emotional Empathy and Sociality". *Neuropsychopharmacology* 41: 2638-46.

Douglas, T. 2008. "Moral Enhancement". *Journal of Applied Philosophy* 25(3): 228-45.

Dubljević, V., & Racine, E. 2017. "Moral enhancement meets normative and empirical reality: assessing the practical feasibility of moral enhancement neurotechnologies". *Bioethics*, *31*(5): 338-348..

Earp, B. D., Douglas, T., & Savulescu, J. 2017. "Moral Neuroenhancement". In L. Johnson & Rommelfanger, K. (Eds.). *The Routledge Handbook of Neuroethics*. Routledge.

Earp, B. D. 2018. "Psychedelic Moral Enhancement". *Royal Institute of Philosophy Supplement* 83: 415-39.

Earp, B. D., McLoughlin, K., Monrad, J., Clark, M. S., & Crockett, M. 2020. "How social relationships shape moral judgment". *PsyArXiv.*

Eisner, B. 1997. "Set, Setting, and Matrix". *Journal of Psychoactive Drugs* 29(2): 213–216.

Erritzoe, D., Roseman, L., Nour, M. M., MacLean, K., Kaelen, M., Nutt, D. J., & Carhart-Harris, R. L. 2018. "Effects of psilocybin therapy on personality structure". *Acta Psychiatrica Scandinavica*, 138(5): 368-378.

Fabiano, J. 2020. "The Fragility of Moral Traits to Technological Interventions". *Neuroethics*: 1-13.

Fadiman, J. 2011. *The Psychedelic Explorer's Guide*. Vermont: Park Street Press.

Forstmann, M. & Sagioglou, C. 2017. "Lifetime experiences with classical psychedelics predicts pro-environmental behaviour through an increase in nature relatedness". *Journal of Psychopharmacology* 31: 975–988

Gabay, A. S., Carhart-Harris, R. L., Mazibuko, N., Kempton, M. J., Morrison, P. D., Nutt, D. J., & Mehta, M. A. 2018. "Psilocybin and MDMA reduce costly punishment in the Ultimatum Game". *Scientific reports*, 8(1): 8236..

Gill, R. (Ed.). 2012. *The Cambridge companion to Christian ethics*. Cambridge University Press.

Griffiths, R. R., Richards, W. A., McCann, U., & Jesse, R. 2006. "Psilocybin can occasion mystical-type experiences having substantial and sustained personal meaning and spiritual significance". *Psychopharmacology*, 187(3): 268–83.

Griffiths, R., Richards, W., Johnson, M., McCann, U., & Jesse, R. 2008. "Mystical-type experiences occasioned by psilocybin mediate the attribution of personal meaning and spiritual significance 14 months later". *Journal of psychopharmacology* 22(6): 621–632.

Griffiths, R. R., Johnson, M. W., Richards, W. A., Richards, B. D., McCann, U., & Jesse, R. 2011. "Psilocybin occasioned mystical-type experiences: immediate and persisting dose-related effects". *Psychopharmacology* 218(4): 649–665.

Griffiths, R. R., Johnson, M. W., Richards, W. A., Richards, B. D., Jesse, R., MacLean, K. A., Barrett, F. S., Cosimano, M. P., & Klinedinst, M. A. 2018. "Psilocybin-occasioned mystical-type experience in combination with meditation and other spiritual practices produces enduring positive changes in psychological functioning and in trait measures of prosocial attitudes and behaviors". *Journal of psychopharmacology* 32(1): 49–69.

Haidt, J. 2012. *The righteous mind: Why good people are divided by politics and religion*. Penguin Vintage.

Hare, J. 2019. "Religion and Morality". In Zalta, E. N. (ed.). *The Stanford Encyclopedia of Philosophy* (Fall 2019 Edition), URL = ‹https://plato.stanford.edu/archives/fall2019/entries/religion-morality/› .

Hartogsohn, I. 2016. "Set and setting, psychedelics and the placebo response: An extra-pharmacological perspective on psychopharmacology". *Journal of Psychopharmacology 30*: 1259–1267.

Hartogsohn, I. 2018. "The Meaning-Enhancing Properties of Psychedelics and Their Mediator Role in Psychedelic Therapy, Spirituality, and Creativity". *Frontiers in neuroscience*, 12: 129.

Helion, C., & Pizarro, D. A. 2015. "Beyond dual-processes: the interplay of reason and emotion in moral judgment". *Neuroethics* 11: 109-125.

Hendricks, P. S., Crawford, M. S., Cropsey, K. L., Copes, H., Sweat, N. W., Walsh, Z., & Pavela, G. 2018. "The relationships of classic psychedelic use with criminal behavior in the United States adult population". *Journal of psychopharmacology*, 32(1): 37-48.

Hilton, N. Z., Ham, E., & Green, M. M. 2018. "The roles of antisociality and neurodevelopmental problems in criminal violence and clinical outcomes among male forensic inpatients". *Criminal justice and behavior*, 45(3): 293-315.

Homiak, M. 2019. "Moral Character". In Zalta, E. N. (ed.). *The Stanford Encyclopedia of Philosophy* (Summer 2019 Edition), URL = https://plato.stanford.edu/archives/sum2019/entries/moral-character/.

Jensen, K., Vais, A. & Schmidt, M. F. H. 2014. "The emergence of human prosociality: aligning with others through feelings, concerns, and norms". *Frontier in Psychology* 5(822).

Jensen, K. 2016. "Prosociality". *Current biology* 26(16): R748-R752.

Johnson, R. & Cureton, A. 2019. "Kant's Moral Philosophy". In Zalta, E. N. (ed.). *The Stanford Encyclopedia of Philosophy* (Spring 2019 Edition), URL = ‹https://plato.stanford.edu/archives/spr2019/entries/kant-moral/›.

Johnson, M. W., Hendricks, P. S., Barrett, F. S., & Griffiths, R. R. 2019. "Classic psychedelics: An integrative review of epidemiology, therapeutics, mystical experience, and brain network function". *Pharmacology & therapeutics* 197: 83-102.

Joyce, R. 2007. *The Evolution of Morality*. Cambridge, MA: The MIT Press.

Kettner, H., Gandy, S., Haijen, E., & Carhart-Harris, R. L. 2019. "From Egoism to Ecoism: Psychedelics Increase Nature Relatedness in a State-Mediated and Context-

Dependent Manner". *International journal of environmental research and public health*, 16(24): 5147.

Kettner, H., Rosas, F., Timmermann, C., Kärtner, L., Charhart-Harris, R., & Roseman, L. 2021. "Psychedelic Communitas: Intersubjective Experience During Psychedelic Group Sessions Predicts Enduring Changes in Psychological Wellbeing and Social Connectedness". *Frontiers in Pharmacology* 12 https://doi.org/10.3389/fphar.2021.623985.

Kitcher, P. 2011. *The Ethical Project*. Cambridge, Massachusetts: Harvard University Press.

Korsgaard, C. 2006. "Morality and the distinctiveness of human action". *Primates and philosophers: How morality evolved*: 98-119.

Lane, A., Mikolajczak, M., Treinen, E., Samson, D., Corneille, O., de Timary, P., and Luminet, O. 2015. "Failed replication of oxytocin effects on trust: the envelope task case". *PLOS One* 10(9): e0137000.

Lane, A., Luminet, O., Nave, G., & Mikolajczak, M. 2016. "Is there a publication bias in behavioural

intranasal oxytocin research on humans? Opening the file drawer of one laboratory". *Journal of Neuroen-*

docrinology 28(4): 1–15.

Langlitz, N. 2012. *Neuropsychedelia. The Revival of Hallucinogen Research since the Decade of the Brain*. Berkeley: University of California Press.

Langlitz, N. 2020. "Rightist Psychedelia". Hot Spots, *Fieldsights*, July 21. https://culanth.org/fieldsights/rightist-psychedelia.

Lebedev, A. V., Lövdén, M., Rosenthal, G., Feilding, A., Nutt, D. J., & Carhart-Harris, R. L. 2015. "Finding the self by losing the self: Neural correlates of ego-dissolution under psilocybin". *Human brain mapping* 36(8): 3137–3153.

Lerner, M. & Lyvers, M. 2006. "Values and beliefs of psychedelic drug users: A crosscultural study". *Journal of Psychoactive Drugs* 38: 143–147.

MacLean, K. A., Johnson, M. W., & Griffiths, R. R. 2011. "Mystical experiences occasioned by the hallucinogen psilocybin lead to increases in the personality domain of openness". *Journal of psychopharmacology* 25(11): 1453–1461.

Mason, N. L., Mischler, E., Uthaug, M. V., & Kuypers, K. P. 2019. "Sub-acute effects of psilocybin on empathy, creative thinking, and subjective well-being". *Journal of psychoactive drugs*, 51(2): 123-134.

Miller, C. B. 2020. "Empirical Approaches to Moral Character". In Zalta, E. N. (ed.). *The Stanford Encyclopedia of Philosophy* (Fall 2020 Edition), URL = https://plato.stanford.edu/archives/fall2020/entries/moral-character-empirical/.

Milliére, R., Carhart-Harris, R. L., Roseman, L., Trautwein, F., Berkovich-Ohana, A. 2018. "Psychedelics, Meditation, and Self-Consciousness". *Frontiers in Psychology* 9(1475).

Mosig, Y. D. 1989. "Wisdom and compassion: What the Buddha taught a psycho-poetical analysis". *Theoretical & Philosophical Psychology*, 9(2).

Neumann, C. S., Hare, R. D., & Pardini, D. A. 2015. "Antisociality and the construct of psychopathy: Data from across the globe". *Journal of personality* 83(6): 678-692.

Noorani, T., Garcia-Romeu, A., Swift, T. C., Griffiths, R. R., & Johnson, M. W. 2018. "Psychedelic therapy for smoking cessation: qualitative analysis of participant accounts". *Journal of Psychopharmacology* 32(7): 756-769.

Nour, M. M., Evans, L., Nutt, D., & Carhart-Harris, R. L. 2016. "Ego-dissolution and psychedelics: validation of the ego-dissolution inventory (EDI)". *Frontiers in human neuroscience (10).*

Parfit, D. 2011. *On what matters* (Vol. 1). Oxford University Press.

Penner, L. A., Dovidio, J. F., Piliavin, J. A., & Schroeder, D. A. 2005. "Prosocial behavior: Multilevel perspectives". *Annu. Rev. Psychol.* 56: 365-392.

Persson, I., & Savulescu, J. 2012. *Unfit for the future: the need for moral enhancement*. OUP Oxford.

Pollan, M. 2019. *How to change your mind: What the new science of psychedelics teaches us about consciousness, dying, addiction, depression, and transcendence*. Penguin Books.

Pokorny, T., Preller, K. H., Kometer, M., Dziobek, I., & Vollenweider, F. X. 2017. "Effect of Psilocybin on Empathy and Moral Decision-Making". *The international journal of neuropsychopharmacology*, 20(9): 747–757.

Rai, T. S., & Fiske, A. P. 2012. "Beyond harm, intention, and dyads: Relationship regulation, virtuous violence, and metarelational morality". *Psychological inquiry*, 23(2): 189-193.

Raus, K., Focquaert, F., Schermer, M., Specker, J., Sterckx, S. 2014. "On Defining Moral Enhancement: A Clarificatory Taxonomy". *Neuroethics* 7: 263-73.

Regis Jr, E. 1980. "What is ethical egoism?". *Ethics*, 91(1): 50-62.

Richards, W. 2015. "11. Discipline and Integration". In *Sacred Knowledge*. New York: Columbia University Press: 119-125.

Richards, W. A. 2015. "Understanding the religious import of mystical states of consciousness facilitated by psilocybin." In J.H. Ellens and B. Roberts (Eds.). *The Psychedelic Policy Quagmire: Health, Law, Freedom, and Society*. Santa Barbara, CA, Denver, CO: Praeger: 139–144.

Richards, W. 2017. "Psychedelic Psychotherapy: Insights From 25 Years of Research". *Journal of Humanistic Psychology*, 57(4): 323–337..

Rocha, J. M., Osório, F. L., Crippa, J. A. S., Bouso, J. C., Rossi, G. N., Hallak, J. E., & Dos Santos, R. G. 2019. "Serotonergic hallucinogens and recognition of facial emotion expressions: a systematic review of the literature". *Therapeutic advances in psychopharmacology* 9: 2045125319845774..

Roseman, L., Nutt, D. J., & Carhart-Harris, R. L. 2018. "Quality of Acute Psychedelic Experience Predicts Therapeutic Efficacy of Psilocybin for Treatment-Resistant Depression". *Frontiers in pharmacology*, 8.

Saunders, N., Saunders, A., & Pauli, M. 2000. *In search of the ultimate high: spiritual experience from psychoactives*..

Schaefer, G. O. 2015. "Direct vs. Indirect Moral Enhancement". *Kennedy Institute of Ethics Journal* 25(3): 261-89.

Shalvi, S., & De Dreu, C. K. 2014. "Oxytocin promotes group-serving dishonesty". *Proceedings of the National Academy of Sciences,* 111(15): 5503-5507.

Shook, J. R. 2012. "Neuroethics and the Possible Types of Moral Enhancement". *AJOB Neuroscience* 3(4): 3-14.

Sparrow, R. 2014. "Egalitarianism and Moral Bioenhancement". *The American Journal of Bioethics* 14(3): 20-8..

Stanford, C., Allen, J. S. & Antón, S. C. 2017. *Biological Anthropology*, fourth edition. London: Pearson.

Strohminger, N., & Nichols, S. 2014. "The essential moral self". *Cognition*, 131(1): 159-171.

Studerus, E., Kometer, M., Hasler, F., & Vollenweider, F. X. 2011. "Acute, subacute and long-term subjective effects of psilocybin in healthy humans: a pooled analysis of experimental studies". *Journal of psychopharmacology*, 25(11): 1434-1452.

Studerus, E., Gamma, A., Kometer, M., & Vollenweider, F. X. 2012. "Prediction of psilocybin response in healthy volunteers". *PloS one* 7(2), e30800.

Swift, T. C., Belser, A. B., Agin-Liebes, G., Devenot, N., Terrana, S., Friedman, H. L., Guss, J., Bossis, A. P., & Ross, S. 2017. "Cancer at the Dinner Table: Experiences of Psilocybin-Assisted Psychotherapy for the Treatment of Cancer-Related Distress". *Journal of Humanistic Psychology* 57(5): 488–519.

Tennison, M. N. 2012. "Moral Transhumanism: The Next Step". *Journal of Medicine and Philosophy* 37: 405-416.

Thiessen, M. S., Walsh, Z., Bird, B. M., & Lafrance, A. 2018. "Psychedelic use and intimate partner violence: The role of emotion regulation". *Journal of psychopharmacology*, 32(7): 749-755.

Trautwein, F., Naranjo, J. R. & Schmidt, S. 2014. "Meditation Effects in the Social Domain: Self-Other Connectedness as a General Mechanism, in Schmidt, S. & Walach, H. (eds.). *Meditation—Neuroscientific Approaches and Philosophical Implications*. Cham: Springer: 175-99.

Twenge, J. M., Baumeister, R. F., DeWall, C. N., Ciarocco, N. J., & Bartels, J. M. 2007. "Social exclusion decreases prosocial behaviour". *Journal of personality and social psychology,* 92(1).

Van Kleef, G. A., Homan, A. C., Finkenauer, C., Blaker, N. M., & Heerdink, M. W. 2012. "Prosocial norm violations fuel power affordance". *Journal of Experimental Social Psychology* 48(4): 937-942.

van Mulukom, V., Patterson, R. E., & van Elk, M. 2020. "Broadening Your Mind to Include Others: The relationship between serotonergic psychedelic experiences and maladaptive narcissism". *Psychopharmacology*, 237(9): 2725–2737.

Walker, R. L., & Ivanhoe, P. J. (Eds.). 2007. *Working virtue: Virtue ethics and contemporary moral problems*. Oxford University Press.

Watts, R. Day, C., Krzanowski, J., Nutt, D., Carhart-Harris, R. 2017. "Patients' accounts of increased 'connection' and 'acceptance' after psilocybin for treatment-resistant depression". *Journal of Humanistic Psychology* 57(5): 520–564.

Watts, R., & Luoma, J. B. 2020. "The use of the psychological flexibility model to support psychedelic assisted therapy". *Journal of Contextual Behavioral Science* 15: 92-102.

Wikipedia 2021. Prosocial behaviour. Link: https://en.wikipedia.org/wiki/Prosocial_behavior. Accessed 04.08.21.

Wyatt, T. D. 2017. *Animal Behaviour—a very short introduction*. Oxford: Oxford University Press.

Young, S. N. 2013. "Single treatments that have lasting effects: some thoughts on the antidepressant effects of ketamine and botulinum toxin and the anxiolytic effect of psilocybin". *Journal of psychiatry & neuroscience: JPN* 38(2).

Zaki, J., & Mitchell, J. P. 2013. "Intuitive prosociality". *Current Directions in Psychological Science* 22(6): 466-470.

Zhang, L., Kong, M., & Li, Z. 2017. "Emotion regulation difficulties and moral judgment in different domains: The mediation of emotional valence and arousal". *Personality and Individual Differences* 109: 56-60.

Zinberg, N. E. 1984. *Drug, Set, and Setting: The Basis for Controlled Intoxicant Use*. New Haven: Yale University Press.