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Center for Cognition and Neuroethics University of Michigan-Flint Philosophy Department 544 French Hall 303 East Kearsley Street Flint, MI 48502-1950

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Feeling Good: Integrating the Psychology and Epistemology of Moral Intuition and Emotion

Hossein Dabbagh

Doha Institute for Graduate Studies Institute for Cognitive Science Studies

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Biography

Hossein Dabbagh is an Assistant Professor in the philosophy program at Doha Institute for Graduate Studies and Adjunct Lecturer at Institute for Cognitive Science Studies. He is also working as a Consultant for "Muslim Biomedical Ethics" project at Institute of Ismaili Studies. He studied moral philosophy during his Doctorate at University of Reading and University of Oxford. His research interest is residing at the intersection of the cognitive sciences, neuroscience, philosophy, and psychology, and his areas of specialization are moral epistemology and psychology, neuroethics, biomedical ethics, and metaphor and cognition.

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Feeling Good: Integrating the Psychology and Epistemology of Moral Intuition and Emotion

Hossein Dabbagh

Abstract

Is the epistemology of moral intuitions compatible with admitting a role for emotion? I argue in this paper that moral intuitions and emotions can be partners without creating an epistemic threat. I start off by offering some empirical findings to weaken Singer's (and Greene's and Haidt's) debunking argument against moral intuition, which treat emotions as a distorting factor. In the second part of the paper, I argue that the standard contrast between intuition and emotion is a mistake. Moral intuitions and emotions are not contestants if we construe moral intuition as non-doxastic intellectual seeming and emotion as a non-doxastic perceptual-like state. This will show that emotions support, rather than distort, the epistemic standing of moral intuitions.

Keywords

Moral Intuition, Emotion, Seemings, Non-Doxastic, Singer, Greene, Haidt

1. Introduction

Intuition sceptics believe that some of our intuitions do not have any epistemic value as they fail to provide moral knowledge (D. Sosa 2006, 633; E. Sosa 1998).¹ There are at least two different sorts of scepticism about intuition: conceptual and empirical.² The most prominent form of conceptual scepticism is raised by Benacerraf (1973), who doubts the possibility of having successful intuition and intuitive knowledge, since it is not clear what we can say about a *causal* relation between intuitions and what is intuited. The most prominent version of empirical scepticism comes from empirical studies that seem to suggest that intuitions are systematically and fundamentally biased. Although these two versions are different, they reach the same conclusion. Both claim that although we can think of conditions under which intuition has a positive epistemic status, those conditions are not, or *cannot* be, fulfilled.

^{1.} For more details about the scepticism debate, see Williamson (2004).

We can also think of two sorts of scepticisms: global and selective. Sinnott-Armstrong (2006b), for example, is a global sceptic about the epistemology of moral intuition. Singer's (2005) scepticism, however, is a selective one with regard to moral intuition.

My purpose in this paper is to elaborate and critically examine the empirical variety of scepticism about intuition. Recent empirical studies in cognitive science and neuroscience have been thought to suggest worrying conclusions about philosophical and moral intuitions. For instance, they claim that intuitions about knowledge are culturally-dependent; that intuitions about intentional action have a biased source; and that moral intuitions are vulnerable to emotions, ordering and wording "frame effects" (Knobe and Nichols 2008, Ch. 1; Sinnott-Armstrong 2006a & 2008; Petrinovich and O'Neill 1996; Greene 2008). These experimental works, in fact, show that different kinds of intuitions philosophers use in ethics, epistemology, philosophy of action, philosophy of language, etc. are systematically biased and epistemologically unsound. Swain, Alexander, and Weinberg, for example, write,

We take the growing body of empirical data impugning various intuitions to present a real challenge for philosophers who wish to rely on intuitions as evidence (2008, 153).

I focus my discussion on issues raised in cognitive science about intuitions used in ethics. I argue that the empirical data does not necessarily create a threat to the epistemic status of moral intuition. In order to do that, I will show, first, there are other empirical findings that contradict the empirical findings cited by critics such as Singer, and actually support rather than undermine moral intuition's epistemic status. Second, I will offer a new non-doxastic model for the epistemology and psychology of moral intuition that presents a theory of emotion suited to moral intuition. This will show that emotions do not *always* cloud moral intuitions' epistemic status.

The plan for this paper is as follows. In the next section, I introduce a famous empirical evolutionary debunking argument against moral intuition raised by Singer. I argue that Singer's argument is not justified. In the section after that, I discuss three empirical projects arguing that emotions *support*, rather than distort, the epistemic standing of moral intuitions. In this way, we can appreciate that the distinction between reason and emotion is less clear-cut than many have supposed. Then, I introduce and use the *non-doxastic seeming* account of intuition to build up an integrated psychological-epistemological model that accounts for the role of emotion. This model, I show, can rebut the empirical psychologists' position against moral intuition and make room for intuition and emotion to be partners rather than contestants.

2. Singer's Evolutionary Debunking Argument for Radical Anti-Intuition Ethics

In the last decade, empirical social and moral psychologists have developed an interest in expressions of (dis)approval which are called "moral intuitions." They often say that moral intuitions are, in fact, nothing but "social intuitions," and social intuitions are, for example, first impressions or *immediate* responses (Appiah 2008, Ch. 3; Cushman, Young and Hauser 2006).

Peter Singer has long argued that we should be suspicious of our intuitive moral judgments. He defines moral intuitions as relatively *unreflective* moral judgments about *particular* cases (Singer 1981, Ch. 3).³ Singer reasons that much of the opposition to utilitarianism has come from counter-utilitarian moral intuitions. Singer has recently given a new argument to this effect, based heavily on empirical work in empirical moral and social psychology done by Joshua Greene and Jonathan Haidt (Singer 2005). Singer claims that this new work shows moral intuition to be methodologically and epistemologically unsound.

In this section, I will develop a counterargument to Singer's argument. I start by outlining the psychological research. The discussion of Greene and Haidt will be somewhat cursory, as my main target is Singer's substantive ethical argument.

2.1 Joshua Greene's Moral Tribes

Joshua Greene and his colleagues have written numerous empirical works on the psychology of moral judgments (Greene, Sommerville et al. 2001; Greene, Nystrom et al. 2004; Greene, Paxton, et al. 2011; Greene, Paxton, et al. 2013). Greene's most famous research program involves using functional Magnetic Resonance Imaging (fMRI) to study certain kinds of moral judgments. Subjects are placed in fMRI machines and asked to react to various moral and non-moral dilemmas. fMRI technology shows which parts of the brain are more active during this task and, presumably, which parts of the brain are more responsible for producing the relevant judgments.

In a series of works, Greene gives a philosophical account for such experiments (Greene 2008; 2013, Chs. 4-5; 2014; 2015). He distinguishes between "philosophical deontology," which emphasizes moral rules, and "philosophical consequentialism," which emphasizes producing the best overall consequences for all concerned. In Greene's favored terminology, deontology refers to judgments in favor of characteristically deontological

^{3.} For an alternative view, see Austin (2003).

conclusions, e.g., "It is wrong despite the benefits." However, consequentialism refers to judgments in favor of characteristically consequentialist conclusions, e.g., "Better to save more lives."

Greene posits that if it turns out that characteristically deontological judgments are driven by emotion, then that raises the possibility that deontological philosophy is also driven by emotion. To say that our deontological philosophy is driven by emotion, in Greene's view, means that we judge an action permissible because we feel good about it or have positive emotion towards it. Greene's account, which assumes a contentious Humean theory of motivation, posits that cognitive representations are inherently neutral representations, in the sense that they do not automatically trigger particular behavioral responses or dispositions. In contrast, *emotions* have automatic effects and are behaviorally valenced.

Greene found that answering moral dilemmas in a consequentialist manner takes longer and that fMRI shows greater frontal-lobe activity (associated with cognitive processing) correlated to these judgments. In fact, Greene found that such responses revealed greater activity in *some* areas of the frontal lobe, particularly the Dorsolateral Prefrontal Cortex (DLPFC). By contrast, answering moral dilemmas in a deontological manner happens more quickly and fMRI also shows that there is a correlation between the brain activity in the frontal lobe, but a different part associated with emotional processing in the amygdala, Ventromedial Prefrontal Cortex (VMPFC), Default Mode Network (DMN), Temporoparietal Junction (TPJ), and these judgments (Greene 2015).

In their most well-known example, Greene and his colleagues try to explain the typical pattern of responses to the "trolley dilemma." It is characteristically deontological to judge that an agent may not push an innocent person to his death as a means of saving five others (the footbridge scenario). It is characteristically consequentialist to judge that an agent *may* divert a threatening vehicle from a track containing five innocents to a track containing one innocent (the switch scenario).⁴

Greene takes the psychological evidence to suggest that the thought of pushing someone to his death in an "up close and personal" manner (as in the footbridge scenario) is more emotionally *salient* than the thought of bringing about similar consequences in a more impersonal way (e.g., by hitting a switch, as in the switch scenario). Greene's rationale for distinguishing between *personal* and *impersonal* forms of harm is largely evolutionary: he says that "up close and personal" violence has been around for a very

^{4.} In a different manner, there are some philosophers such as Kamm (1991) who interpret the trolley problems as a matter of the doctrine of double effect rather than utilitarianism vs. deontology.

long time, reaching far back into our primate lineage (Wrangham and Peterson 1996). In contrast, when harm is impersonal, it fails to trigger this alarm-like emotional response, allowing people to respond in a more "cognitive" way—perhaps because it involves a cognitive mechanism not present in our evolutionary past.

Crucially, Greene and his colleagues argue that the difference between these responses lies in our *moral emotions*. In personal dilemmas, the harm is *obvious*, *physical* and the harmed victim is *salient* in the sense that the harm done to him/her is *obviously* relevant. However, in non-personal dilemmas the harm is more *abstract* and the harm to the victim is *not salient*. Based on this distinction, they hypothesised that often, personal moral dilemmas trigger negative morally emotional responses, and that these emotional responses cause moral judgments. They also hypothesised that non-personal dilemmas do not trigger emotional responses. Moreover, subjects who gave an unusually consequentialist response to personal dilemmas (e.g., judging it is permissible to push the stranger) took longer to respond than subjects giving the typical response (Greene, Morelli et al. 2008). This suggests that the unusual respondents experienced some *cognitive* conflict when they were thinking it through (Greene 2008, 63).

Greene and his colleagues argue that deontological patterns of moral judgment are driven by emotional responses, while consequentialist judgments are driven by cognitive processes. Greene suggests that deontology is a kind of "moral confabulation." We have strong feelings that tell us in clear and uncertain terms that some things *simply cannot be done* and that other things *simply must be done*. But it is not obvious how to make sense of these feelings, and so we, with the help of some especially creative philosophers, make up a rationally appealing story. The story is there are these things called "rights" which people have, and when someone has a right, you cannot do anything that would take it away or violate it (Greene 2008, 64).

In contrast, consequentialism, in Greene's view, is more "cognitive," in the sense that it is by nature systematic and aggregative. All consequentialist decision-making is a matter of balancing competing concerns, taking into account as much information as is practically feasible. The advantage of having cognitive neutral representations is that they can be mixed and matched in a particular situation without pulling the agent in multiple behavioral directions at once. Thus, the cognitive representations enable us to have highly flexible behavior (in contrast to emotional deontology-driven response).

Greene has introduced additional features in more recent statements of his view. But we need not concern ourselves with these here, since Singer's argument (my main target)

relies on Greene's early work.⁵ Before getting to that argument, let us briefly consider Haidt's social psychological research.

2.2 Jonathan Haidt's Righteous Mind

Jonathan Haidt directs attention to psychological studies of the relationship between moral reasoning and intuition (Haidt 2001 and 2007; Haidt and Björklund 2008). Haidt, among other psychologists, distinguishes between two cognitive processes: the *unconscious* intuitive process and the *conscious* rational one (Bargh 1994; Bargh and Chartrand 1999; Sloman 1996; Stanovich and West 2000; Wilson 2002). He says, in this vein, that moral intuition is

the sudden appearance in consciousness of a moral judgment, including an affective valence (good-bad, like-dislike), without any conscious awareness of having gone through steps of search, weighing evidence, or inferring a conclusion. Moral intuition is therefore the psychological process that the Scottish philosophers talked about, a process akin to aesthetic judgment. One sees or hears about an event and one instantly feels approval or disapproval (2001, 818).

In Haidt's view, intuitions in fact control our daily moral judgments in a *rapid* and *immediate* way. Haidt, like Greene, claims that if you ask people to *try* reasoning, they merely *confabulate* plausible-sounding rationalisations, which in fact bear no fixed relationship to their actual response. Hence, claims Haidt, this shows that reasoning was *unnecessary* to the process that produced the intuition.

In *The Righteous Mind* and his famous paper, "The Emotional Dog and Its Rational Tail: A Social Intuitionist Approach to Moral Judgment," Haidt uses subjects' responses to thought experiments concerning societal taboos (e.g., incest, and bestiality) to demonstrate a phenomenon he dubs "moral dumbfounding." In many moral situations, when we do not have any further arguments and have run out of reasons, we say "intuitively" that the action is simply wrong. For example, imagine that a brother and sister start having sex and they both feel it brings them closer as siblings. Most people have very strong negative reaction about this scenario. Their intuitions say that this is morally wrong yet cannot explain why.

Haidt maintains that the majority of our moral reasoning is a kind of *post hoc* reasoning. Although people often have an intuition that incest is wrong, they do not

^{5.} As an alternative view and criticism of Greene, see Sauer (2012).

have a reason for that. Rather, they seek to rationalise their intuition after it occurs to them. In order to explain this, Haidt refers to the findings of neuroscience to show that the *ventro-medial* area of the prefrontal cortex of the brain (associated with automatic heuristics which are often emotional) effectively houses these moral intuitions.⁶

In a nutshell, according to Haidt, most of our daily moral judgments are intuitive in the sense that reasoning and conscious deliberation do not make any contribution to our moral judgments, directly.⁷ In Haidt's view, *unconscious emotional* processing is responsible for most of our ordinary moral judgment.

Having discussed the Greene and Haidt research that Singer relies upon,⁸ I now focus on Singer's main debunking argument. I argue that his argument is not justified.

2.3 Singer's Attack: Evolutionary Biology and the Debunking of Moral Intuitions

Singer adds to the psychological work just described by invoking general principles of evolutionary psychology, which he builds toward an *evolutionary debunking* of moral intuition. Singer writes,

Our biology does not prescribe the specific forms our morality takes... Nevertheless, it seems likely that all these different forms are the outgrowth of behavior that exists in social animals, and is the result of the usual evolutionary processes of natural selection. Morality is a natural phenomenon. (2005, 337).

Per Greene and Haidt, our moral intuitions are produced by *emotional* processes. And this mechanism probably evolved in response to the selection pressures faced by our ancestors who lived in small societies.

In Singer's view, moral psychology and evolution together can give us an explanation of how we *have* access to some of our moral intuitions. According to this explanation, we have intuitions because we have a certain psychological mechanism that produces them, and we have that mechanism because of our evolutionary history. Singer then concludes that

^{6.} Greene (2013; 2014; 2015) recently makes clearer in his formulation of his argument that the VMPFC is not just associated with emotions but with automatic heuristics which are often emotional.

For alternative views and criticism of Haidt, see Pizarro and Bloom (2003), Salzstein and Kasachkoff (2004), Sauer (2012a), Railton (2014) and Musschenga (2008 & 2009).

^{8.} Haidt, unlike Greene, does not think emotional moral intuitions are specifically deontological. However, they both think that commonsense moral intuitions are largely emotion-driven.

while I have claimed that evolutionary theory explains much of common morality, including the central role of duties to our kin, and of duties related to reciprocity, I do not claim that this justifies these elements of common morality. ... Advances in our understanding of ethics do not themselves directly imply any normative conclusions, but they undermine some conceptions of doing ethics which themselves have normative conclusions. Those conceptions of ethics tend to be too respectful of our intuitions. Our better understanding of ethics gives us grounds for being less respectful of them (2005, 343 & 349).

Singer's main debunking argument against moral intuition can be articulated as follows:

(P1) The content of certain human systems of morality (i.e., commonsense deontological morality, egoistic intuitions, and intuitions favouring kinship or reciprocal altruism) is shaped by evolutionary processes.⁹

(P2) If the content of such moral intuitions is shaped by evolutionary processes that have nothing to do with moral truth, we have no reason to believe that our moral intuitions reflect any rational and universal moral truth.

(C) Therefore, moral intuitions—except act-utilitarian intuitions—are epistemologically (and methodologically) unsound and should be discarded.

I wrote "except act-utilitarian intuitions" because Singer recently excludes act-utilitarian intuitions from his debunking argument. In *The Point of View of the Universe* (2014), de Lazari-Radek and Singer extensively argue that evolution cannot explain act-utilitarian intuitions (Singer and de Lazari-Radek 2014, Ch. 3&7).¹⁰ Instead, they believe evolution can explain moral intuitions commonly seen as opposed to strict utilitarianism, such as those favouring altruism towards family and those requiring reciprocity. They write,

Evolution explains altruism towards kin by seeing it as promoting the survival of the genes we carry. We can do this in many ways, but in

^{9.} For an alternative view, see Kahane (2011) and Tropman (2014).

^{10.} For an alternative view, see Hooker (2016).

normal circumstances, we will do it best by living a long life, finding a mate or mates, having children, and acquiring the resources, status, or power that will improve the prospects of our children and other close kin surviving, reproducing, and in turn promoting the survival of their children (2014, 194).

Thus, based on Singer's debunking argument, since moral intuitions (except act-utilitarian intuitions) are the product of the specific sort of evolutionary processes responsible for these moral intuitions, they had better be explained away.

2.3.1 Emotion as the Lynchpin of Singer's Argument

A natural response to Singer is to insist that deontological moral principles may be right *even if* their support comes from intuitions that are shaped by evolutionary forces. Suppose that Singer is right and so our deontological intuitions are caused by evolutionary forces. Suppose as well that there's no *positive* reason to believe that evolutionary forces have much to do with the moral truth. All this shows is that we are unable to provide *positive* reason for believing that the causal process behind deontological intuitions is hooked up to moral truth. This *does not* show that deontological intuitions are false. They *may* very well be true; it is just that we cannot demonstrate grounds for trusting their reliability.¹¹

Singer's position would be more convincing if we had evidence that deontological intuitions are caused not by a process of uncertain reliability, but by a process of demonstrated proneness to error. The difference here is between relying upon an untested telescope that was made by a process that has nothing to do with making a good telescope and relying upon a telescope that we *know* has produced bad measurements in the past. So far, Singer has only shown that our moral intuitions are an untested telescope. But he wishes to go farther: he wishes to show that our intuitions are demonstrably prone to errors.

This is the point of introducing the Haidt and Greene research. Singer wants to claim that this research shows that our intuitions are caused by *emotional* psychological processes. And emotion, he supposes, is known to be a distorting factor. Evolution is

Note that Singer is not just saying commonsense intuitions are emotionally driven but that they are driven by morally-irrelevant factors. Singer (and Greene) have recently come to emphasize it. For a related argument, see Street (2006) and Joyce (2000).

simply disconnected from truth, but emotion is thought to be an active barrier to truthful perception. Singer writes,

If, however, Greene is right to suggest that our intuitive responses are due to differences in the emotional pull of situations that involve bringing about someone's death in a close-up, personal way, and bringing about the same person's death in a way that is at a distance, and less personal, why should we believe that there is anything that justifies these responses? (2005, 347).

Of course, not everyone agrees with Singer that emotions as such are distorting (Mason 2011; Lenman 2015).¹² The rest of this paper will argue that we can have reason to trust our moral intuitions *even if* they are caused by emotion-linked brain processes. In the next section, I introduce three empirical cases to bridge the gap between the psychology and epistemology of moral intuitions.

3. Emotion and Intuition: Empirical Evidence

Given what Singer argues, let us grant that our moral intuitions are the product of mechanisms that evolved, and that they are mediated through emotional processes, as suggested by the research of Greene and Haidt. However, there is a gap between the psychology of moral intuitions that Singer endorses and the epistemologicalmethodological consequences he wants to infer. Although Singer supposes that moral intuitions are the product of emotional processes with a certain kind of evolutionary history, he is not clear why that should make them unfitting as a basis for moral judgments. Singer writes,

Haidt's behavioral research and Greene's brain imaging studies suggest the possibility of distinguishing between our immediate emotionally based responses, and our more reasoned conclusions (2005, 349-350).

Singer here seems to presuppose a familiar sort of purely rationalist picture about moral intuitions according to which the presence of any degree or type of emotion distorts intuitive judgments. Such a pure rationalistic account of moral intuitions might be attractive to ethicists who thought that our moral judgments should derive from pure reason (e.g., Kant or Sidgwick, on some interpretations). If emotion is generally

^{12.} Singer might object that it is not emotions as such, but emotions that are sensitive to distance that are a problem.

a distorting factor in moral thinking, then it is better not to attend to those moral judgments that are mediated through emotional processes.

However, there are problems with this pure rationalistic account of moral intuition. I will now raise three empirically-based objections to this picture:

(1) The first objection is that the distinction between emotional and reasoned responses itself is not as clear-cut as it appeared in Singer's, Greene's and Haidt's work. In fact, dividing up intuitive moral judgments into "emotionally-based ones" and "more reasoned ones" might not be possible. Defending a grey-area account of moral intuitions between emotion and reason seems more tenable (Fine 2006; Kennett and Fine 2009). For example, many researchers in cognitive science claim that at least *some* emotion has a *cognitive* component (Lazarus 1991; Scherer 1997; Prinz and Nichols 2010, 118). That cognitive component is, indeed, presumed to be an evaluative judgment. The view usually says that emotions are a species of evaluative judgment, not that all evaluative judgments are emotions. For instance, "shame" might comprise the judgment that there has been damage to one's well-being together with a distinctive feeling or motivational state. So, if this is the case for shame, then having some emotions with cognitive elements can be a helpful rather than a distorting factor for our intuitions. This however does not entail that *all* emotions have a cognitive element.¹³

Of course, this view of the relationship between emotion and cognition is also contentious. But that is the point. Singer seems to assume that cognitive scientists have readily to hand a reliable distinction between emotion and cognition. But cognitive scientists are far from agreed upon how to draw such a distinction, or whether one is tenable at all. For example, Haidt himself recently dropped talk of emotion from his social intuitionist account, mainly for this reason (Haidt 2013, Ch. 1). Greene also recently backed away from his earlier account, acknowledging that emotion plays some role in consequentialist intuition as well (Greene 2014).

(2) The second problem with the pure rationalistic account of moral intuition is that even if we can divide moral judgments into emotional intuitions and reasoned intuitions, there is very little reason to think that, as a general psychological law, emotion *always* distorts our intuitive judgments. It seems likely, on the contrary, that the relationship between emotion and intuitive judgments will be different from case to case. For some cases, we may indeed do worse when our judgments are influenced by emotion. But in others, emotion may in fact be *necessary* for *good* intuitive judgment.

^{13.} For it cannot be right that emotions are all truth-apt. It is absurd to claim that emotions can be inserted into valid forms of argument like *modus ponens*.

Some of the work of Antonio Damasio and the famous case of Phineas Gage suggest just that (Damasio 1994, 3-10).¹⁴ Gage and Damasio's patients suffered from the attenuation of "somatic markers" and injuries in some of the emotional regions of their brains (i.e., VMPFC).¹⁵ As a result, although these people are normal in intelligence and semantic knowledge, they show weaknesses in what we might consider practical rationality, e.g., taking what seem to be risks and doing poorly in gambling tasks. Damasio takes these patients to show that emotions sometimes carry important information about the environment and have a vital role in our reasoning.

For example, in a rigged game experiment (the Iowa Gambling Task), players were shown four decks of cards. They turned over cards from the decks, in any order they wanted. Some cards paid money (\$50 or \$100), though some were penalties instead. Two decks were "good," producing lower benefits but a higher total pay-out and two decks were "bad," producing large earnings but greater total costs. Players were not given any explicit information about the existence of "good" and "bad" decks.

The study involved two groups of players—subjects without brain damage and patients with damage to *ventro-medial* prefrontal cortex. Normal players implicitly understood the distribution after turning about 50 cards, most of them concluded that "Two decks are good, and two are bad." The patients with brain damage, however, never understood. While people played, researchers measured skin conductance responses during the gambling task and they recognized that "the frontally damaged subjects did not have the feelings necessary for rational action" (Damasio 1994, 212-217). They also found that these people showed no emotional response during the game. Damasio believes that after their brain injury, the brain-damaged patients tended to make poor financial and personal decisions and have difficulty with moral judgments.¹⁶

Here we have a case where emotions, far from being a distorting factor, are actually *essential* to good judgment. If this is the case for practical rationality, then it might also be the case for the moral domain. That requires a tendentious assumption, but the point is that we just do not know enough about the relationship between emotional processes and good intuitive judgment to decide one way or the other. The pure rationalistic picture, although perhaps appealing, is not well supported by the psychological facts.

^{14.} For more details of Gage's case, see also Damasio (1994, Chs. 1&2).

Again, the VMPFC is not just associated with emotion and an emotional deficit is not what's distinctive of patients with VMPFC damage. It's the attenuation of "somatic markers" that inform personal decisionmaking.

^{16.} For more details about emotions and feelings, see Damasio (1999, Ch. 2&9).

So, the fact that moral intuitions are produced by emotional processes is not enough to require doubts about them.

(3) The third empirical response to Singer can be derived from social psychology. Some social psychologists claim that moral intuitions, like other intuitions which come naturally in social situations, are more reliable than conscious deliberative judgments under certain conditions. To explain this, these psychologists mostly appeal to what is called "social cognition," the ability to process, store, and apply information about other people, especially in social interactions. The development of social cognition, these psychologists believe, is tightly connected with the development of "social emotions." It is widely accepted that social emotions are communicated to other people and generally shape our social processes (Hareli and Parkinson 2008). Theorists often include emotions such as shame, embarrassment and jealousy as social emotions, because these depend upon awareness of other people's mental states. In contrast, basic emotions such as happiness and sadness need only the awareness of one's own mental state.

Since most psychologists think of moral intuition as something like social cognition and social emotion, they believe that moral intuitions help us in navigating our social world. We can draw some conclusions about moral intuition from the observation that moral intuition has a subject matter, emotional effect, and role that is shared with social cognition and emotion. For example, according to the philosopher Woodward and the psychologist Allman (2007), one of the roles of social emotions or moral intuitions is to help people to circumvent the limits of analytical, rule-based, or reason-based decisionmaking procedures such as cost-benefit analysis. They hold that the number of different dimensions or different kinds of considerations that human beings are able to fully take into account in explicit conscious rule or reason-guided decision-making is fairly *small*. In support of this claim, Woodward and Allman refer to recent studies by the psychologist Ap Dijksterhuis and his colleagues (Dijksterhuis, Bos, Nordgren and van Baaren 2006).

Dijksterhuis and colleagues differentiate between *mode* of thought (conscious vs. unconscious), *complexity* of thought, and *quality* of choice. Complexity is defined as the amount of information a choice is based on. They hypothesised that conscious thought, because of its precision, leads to good quality choices in simple matters. However, because of its low capacity, conscious thought leads to worse quality choices with more complex issues. On the other hand, unconscious thought, because of its relative lack of precision, is expected to lead to choices of lower quality generally. However, since the quality of unconscious thought does not worsen with increased complexity, in complex circumstances, unconscious thought can actually lead to better quality choices than conscious thought.

Dijksterhuis and his colleagues investigated this hypothesis in experiments that compared the quality of choices under different conditions. Some participants were not given the opportunity to think at all before choosing between alternatives. Others were able to consciously think a short time before choosing, and others were distracted for a brief period before choosing, during which they could engage in what Dijksterhuis and his colleagues called "unconscious thought."

For example, in one of Dijksterhuis's experiments (2004), participants were given information about four hypothetical apartments in their home city, Amsterdam. Each apartment had 12 different features, for a total of 48 pieces of information, presented in a random order. One of these four apartments was unambiguously more desirable than the others. After the participants read the huge amount of information, they were asked to choose which one was better. Interestingly, only the "unconscious thinkers" reported the appropriate preference for the desirable apartment. The participants who engaged in conscious thinking could not specify a preference for the appropriate apartment over the less desirable ones because, as Dijksterhuis explains, their job was too difficult.

Based on Dijksterhuis's findings, Woodward and Allman claim that unconscious processing—which social emotion can be part of—can sometimes lead to better judgments than conscious deliberation such as in reason-based decisions. They also argue that there is a similarity between social intuitions and moral intuitions, because social cognition, social emotion, and moral intuition have overlapping subject matters and roles (namely, helping us navigate our social world). Hence, it is possible to draw a conclusion about the reliability of moral intuitions from studies on the reliability of social intuitions. If Woodward and Allman are right, we can assume that emotional moral intuitions will at least sometimes lead to judgments or decisions that are superior to those arrived at on the basis of more deliberative, rule and reason-based decision-making strategies (Woodward and Allman 2007, 185).

Singer appeals to cognitive science to cast doubt on emotion-linked moral intuitions. But I have just surveyed three distinct psychological programs suggesting that such an inference is too hasty. Emotions sometimes do not work as a distorting factor and thus cannot ruin moral intuition's epistemic status. In the next section, I build upon the empirical evidence by providing a philosophical account of how emotion and moral intuition can sit comfortably beside each other without epistemic threat.

4. Integrating the Psychology and Epistemology of Moral Intuition

In discussion of intuition, philosophers often distinguish two issues from each other: issues regarding the epistemology of intuition, which deals with questions such as "does intuition justify?," and issues regarding the psychology of intuition, which deals with questions such as "what is intuition?" and "how can intuition be related to emotions?" Some of these philosophers, such as Sinnott-Armstrong, believe that the psychology and epistemology of intuition should be differentiated because the epistemology of intuition is normative and is related to *when* beliefs are justified. This is a different question than the psychological question of *how* beliefs are formed, though it may be possible to use the answer to the psychological question to inform the answer to the epistemological question to inform the answer to the epistemological question of how account aims at an integrated perspective on the psychology and epistemology of intuition.

I start from the idea that intuition is a kind of non-doxastic *intellectual seeming*, similar to perceptual experiences (Bealer 1998; Huemer 2005).¹⁷ The experience of an intuition includes phenomenological features such as a feeling, appropriateness, familiarity, or confidence. I then introduce an account of emotions as non-doxastic quasiperceptual states. When both these elements are in view, we can explain how intuition and emotion can be combined.

We can divide accounts of intuition into those that are doxastic (having to do with belief) and those that are non-doxastic (having to do with non-inferential impression of truth). On the doxastic view, moral intuitions are regarded as non-inferred beliefs about self-evident propositions based on adequate understanding, with this understanding sufficient for their justification.¹⁸ Therefore, on the doxastic view, intuitions are belief-like states (Lewis 1983, x; Audi 2008, 478).¹⁹ To have the intuition that *p* is to have the non-inferential, pre-theoretical and firm belief that *p*. Adopting this account can explain what intuitions are without introducing a new mental kind or phenomenon; that is, it explains intuition in terms of an already *familiar* mental state, i.e., *belief*.

^{17.} I follow Bealer's intellectual seeming account of intuition here. However, Bealer is not talking about moral intuition in particular. He is giving an account of philosophical intuition in general. I elsewhere use Bealer's account of intellectual seeming to give an account of *moral* intuition. See Dabbagh (2018).

I elsewhere criticised this conception of self-evidence based on "sufficient understanding." See Dabbagh (2018a).

^{19.} Ernest Sosa (1998) also advocates an account of intuitions as dispositions-to-believe. He reads intuition as disposition-to-believe merely on the basis of adequate understanding.

Alternatively, on the non-doxastic view, moral intuitions can be explained as seeming states, namely initial intellectual seemings. To have the intuition that *p* is to have the intellectual seeming that *p*. This account defines intuitions as seemings, or as Bealer says "when you have an intuition that A, it seems to you that A" (1992, 101). This kind of seeming is also intellectual rather than perceptual, sensory or introspective, for one can have a certain intuition without having a perception or introspection at all (Bealer 1992, 101f; Pust 2000, 36&45; Sosa 1998, 25&f). Thus, when S intuits that p, it intellectually seems to S that p.

I focus on the non-doxastic seeming account, because this has the advantage of being able to integrate the epistemology and psychology of moral intuition (Musschenga 2010).²⁰ The seeming view can answer both the epistemological question of "does moral intuition justify?" and the psychological question of "what is moral intuition?"

The seeming account supports an analogy between moral intuition and perceptual experience.²¹ Some epistemologists say that perceptual experiences are "translucent presentations," meaning that "a presentational state σ of x *translucent* iff, in having σ , it is presented to x that p is so, and there is no content q (where q \neq p) such that it seems to x that p is presented as being so by q's being presented as being so" (Bengson 2010, 38). According to Bengson, calling intuitions translucent is a way of saying that intuitions are direct (or non-inferred).²²

Moral intuitions are plausibly understood as translucent presentations because insofar as one adequately understands the conceptual constituents of a proposition, one can be immediately struck by its seeming rightness. Consideration of moral propositions produces intellectual seemings with moral content. In effect, what makes an intuition a

^{20.} Note that this does not entail that doxastic views do not have a *psychological* theory of intuition. Audi for example claims that we have to distinguish two different things: believing in a proposition as a psychological state and believing that the content of that proposition is justified. See Audi (1997, 44-49).

^{21.} Hanno Sauer (2012b & 2017) also made similar point that emotional moral intuitions can be analogous to perceptual experiences in justifying moral beliefs non-inferentially. However, my point here is that moral intuition is like intellectual seemings and moral emotion is like perceptual experiences. Seemings and perceptual experiences can justify moral belief non-inferentially.

^{22.} There is a distinction in philosophy of perception between "translucent" and "transparent." The distinction picks out as translucent a class of experiences that are not completely direct or non-inferred. By contrast, transparent experiences are direct or non-inferred. For example, when I look at a tree or when I introspect my visual experience, my experience is transparent to me (Smith 2008). For my purposes, this distinction is not at stake; I will include "transparent" experiences under the "translucent" heading.

moral one is an intellectual seeming with moral content. Like perceptual states, moral intuitions appear to provide non-inferential justification for beliefs (Dancy 2014).

How does emotion relate to the seeming account of moral intuition? Following Tolhurst (1998) and Pryor (2000), seemings have some connection with "feeling" in the sense that when it seems to us that p, we are in a mental state which has a property of "feel as if," "feel of truth," "felt givenness" or "feel of veridicality." When we feel that the content of a seeming is true, we have the feeling of felt veridicality. These "feelings" are markers of particular phenomenological states. This aspect of perceptual phenomenology has "phenomenal force," and it is a justification-making feature of mental states (Huemer 2001).²³ The distinctive characters of particular emotions are also features of phenomenological states, such as the "feeling of sadness" or "feeling of joy." Since epistemologists are willing to credit "felt veridicality," why not "felt joyfulness" or "felt relief" as indicators of some feature of the environment? Thus, the perceptual phenomenology of "feelings" gives us an explanation of how particular emotions are phenomenological features can relate to the seeming account.

If I can show that some emotional experiences are like perceptual experiences (similar to moral intuition), we then have a case that moral intuition and emotion can go hand in hand. I can show that emotional experiences can be a potential cause for non-inferential moral belief (Tolhurst 1990). This will provide us a philosophical theory rather than empirical evidence to support the idea that although moral intuition and emotion are different, they can sit comfortably beside each other without epistemic threat.

Note that although I will say that emotions are like perceptual experience and moral intuition is like perceptual experience, this does not entail that these two perception-like states are connected in *every* respect and *all* emotions are connected to intuition. All I want to show is that there is a possibility that *some* emotions that are similar to perceptual experiences might be connected to moral intuitions in a way that both of them can form non-inferential beliefs.

4.1 Quasi-Perceptualist Theory of Emotion

In recent years, attention has been paid to the development of neo-judgmentalist and perceptual theories of emotions. For example, people like Brady (2009), Doring (2003), Prinz (2006) and Roberts (2003) hold that emotional experiences (e.g., guilt and indignation) can be similar to *affective construals*, *appearances* and *perceptions of value*

^{23.} Some moral intuitionists like Ross allow that a moral judgment can express a feeling of approval. See Stratton-Lake (2002, 14). For more on Ross, see also Dabbagh (2018b).

in that they can represent the world of value. The view is that emotions *perceptually* represent value.²⁴ Jesse Prinz, for instance, argues that sentimentalism can vindicate intuitionism. He writes,

intuitionists believe that moral judgments are self-justifying... they seem to base this assertion on the phenomenology of moral judgments: moral judgments seem self-evident... far from opposing intuitionism, sentimentalism offers one of the most promising lines of defense... sentimentalism explains the phenomenology driving intuitionism, and it shows how intuitionism might be true (2006, 37).²⁵

Prinz believes that sentimentalism can offer a defence of intuitionism because sentimentalism can explain the phenomenology of intuition. Moral intuitions do not need further justification and in this respect, they are similar to certain perceptual experiences. Likewise, emotionally grounded judgments are like perceptual experiences that do not need independent support. In effect, if moral judgments are sentimental, then the judgment that "promise-keeping is right" is self-justifying because promisekeeping generates the positive sentiment expressed by that judgment. The power to generate such positive sentiments is constitutive of being right.

Perceptual theorists generally believe that occurrent emotions are intentional and representational with a certain phenomenal character. It is natural to think that construals, appearances and perceptions are non-doxastic states. So, it is possible to draw an analogy between emotional experiences and perceptual-like states. Following Kauppinen (2013), I call this the quasi-perceptualist account of emotion. According to

The Quasi-Perceptualist Account of Emotion: Some emotional experience can be similar to non-doxastic states such as perceptual-like states.²⁶

Emotions, like perceptions, can come into conflict with our beliefs and judgments. Just like in the Müller-Lyer visual illusion, we might have "conflict" between our "recalcitrant

^{24.} This perceptual view differs from the James-Lange's perceptual theory of emotions in which emotions are constituted by perceptions of bodily changes. See James (1884).

^{25.} Gibbard (2002) also argues that ethical expressivism needs moral intuitions.

^{26.} We can also make a distinction between literal perceptual theories and non-literal ones. Literal ones hold that emotions literally are perceptual states, while non-literal theories hold that there are deep and explanatory analogies between perception and emotion. This distinction is drawn in Brady (2013).

emotion" and belief (Doring 2008). Recalcitrant emotions are emotions that are in tension with the subjects' settled judgment. For example, suppose I judge that my brother's action is justified but I envy him at the same time, or I fear something whilst knowing that it is harmless (D'Arms and Jacobson 2003).²⁷ The conflict between emotion and judgment provides us with good reason to construe emotional experiences as non-doxastic states. Importantly, this sort of conflict is rational without contradiction. As Doring (2003) points out, it is coherent to be afraid of the snake that we know is not dangerous.²⁸

Although the account of emotion that I defend here is non-doxastic, this does not entail that emotions are essentially non-cognitive (Prinz 2008). It is true that emotions have non-cognitive components, but it is not the case that these non-cognitive elements must have constant association with the emotion in question. For example, in the case of imagining some emotion, e.g., fear of something, non-cognitive components such as bodily states are not necessarily involved. As we shall see, emotions (e.g., compassion and shame) can involve evaluative thoughts, perception and judgment. Acknowledging this point does not require fully endorsing judgmentalist theories of the emotions according to which evaluative judgments are identical to, or are necessary constituents of, emotions (Nussbaum 2001, Ch. 1; Solomon 1977).

But if the quasi-perceptualist account of emotion is true, our moral beliefs *can* be based on emotional experience. Emotional experiences can be treated as evidence for epistemic and rational beliefs. However, the rationality of the emotions is contentious. For example, Sinnott-Armstrong endorses the irrationality of the emotions (Sinnott-Armstrong 2006a). He believes that emotions are an epistemologically distorting factor that threaten the possibility of a non-inferential justification in ethics.²⁹ Even Huemer, as a proponent of epistemological intuitionism, believes that emotion distorts moral judgment. He writes,

[E]motions are known to impair judgment with respect to (other) factual questions, so, assuming the truth of moral realism, it is *prima*

^{27.} They believe that the existence of "recalcitrant emotions" give us reason to reject theories of emotion that treat judgments as necessary components of emotions. However, as Roberts writes, recalcitrant emotions cannot be in tension with the cognitive part of our judgments unless they have "a character that can be expressed in thoughts" (2003, 111). See also Lacewing (2006).

^{28.} Compare Gendler's idea of alief, which may be in tension with explicit belief. See Gendler (2008).

^{29.} I elsewhere argued against Sinnott-Armstrong's understanding of non-inferentiality. See Dabbagh (2017).

facie reasonable to assume that emotions impair our moral judgment as well (2008, 378).

However, cognitive sciences, as I argued above, show us that seeing all emotions in this excessively pessimistic way is not plausible. To think about emotional experience as always being a source of epistemic distortion would be wrong. On the contrary, there are some reasons to believe that emotional experiences can sometimes make a positive contribution to our activities in practical rationality.³⁰ So, there is a possibility that some emotions are not distorting factors. If this is right, we are no longer justified in saying that emotions *always* distort our epistemic activities. Instead, emotions (construed as quasiperceptual experiences) might have some cognitive elements assessable for rationality. Let us explain how emotional experiences can be assessable for rationality.

In different theories of emotion, including the quasi-perceptualist account of emotion, it is widely endorsed that emotions are representational states which can depict the world in a certain way (Doring 2003 & 2007; Roeser 2011). Therefore, emotional experiences can be rationally assessed as appropriate or inappropriate. For instance, when we say, "his anger is not appropriate" or "his fear is justified," we mean that the emotion is in a way representing the way the (evaluative) world happens to be. On the other hand, we can have non-inferential justification for believing moral propositions on the basis of having emotional experiences (construed as non-doxastic states). For example, our fear can justify us in believing that we are in danger. Furthermore, while emotions can form non-inferential beliefs, we can ask why we have some emotions, and thus we can offer sufficient reasons—if it is needed—for them. To have a better idea which kind of emotion we are dealing with, we can appeal to what Scanlon calls "judgment-sensitive attitudes." These attitudes, Scanlon writes, are ones that

an ideally rational person would come to have whenever that person judged there to be sufficient reasons for them, and that would, in an ideally rational person, 'extinguish' when that person judged them not to be supported by reasons of the appropriate kind (1998, 20).

Beliefs, fear, respect, anger, and contempt, according to Scanlon, are all such judgmentsensitive attitudes. Just like judgment-sensitive attitudes, the emotions we deal with

^{30.} I do not deny that some emotions can distort. But how do we tell the difference between the distorting ones and the non-distorting ones? Although this question is very important, I will not discuss it in this paper as it needs much more psychological background than can be provided in this space. For current purposes, it is enough to show that at least *some* emotions are not distorting.

here are "emotions as consequences of judgments" in the sense that, for example, fear is an emotion "for which reasons can sensibly be asked or offered" (Ibid). This must be distinguished from mere feelings such as hunger. Following Jones's (2003) discussion of *reason-tracking*, we can claim that emotions allow us to track reasons in the sense that we can register reasons so that we can behave in accordance with them.³¹ For example, one can argue that we can provide reasons for emotions like perceptual experiences cases—if we see the car is red, we can say that it looks red to us.

So, emotions can be appropriate for rationality in three ways: emotions represent the way the (evaluative) world happens to be. Emotions form non-inferential moral belief. Furthermore, a rational person can offer reasons—if it is needed—for having some emotions.³²

To summarize: insofar as moral intuition (construed as intellectual seeming) can form non-inferential moral beliefs, there can be some emotions which form non-inferential beliefs and in doing that they are like moral intuitions because they both are similar to perceptual experiences.

However, suppose one objects that if this is the case, the general worry still remains because these emotions *can* distort when they cause judgments. But this objection ignores the possibility of correction. Suppose we become convinced that some particular emotion-based judgment or belief is distorted because the underlying emotion turns out to be unreliable in this case. We can then recover by adjusting our belief in response to other available evidence, e.g., having confirmation from a third party. Does this make our initial belief inferentially justified? No. The generation of our initial belief is noninferential even if maintaining it under certain challenges requires inference (Ballantyne and Thurow 2013). This places us in agreement with moral intuitionists who think that emotional experience can generate non-inferential justification (McCann 2007). Audi writes in this regard that

[E]motions may reveal what is right or wrong before judgment articulates it; and they may both support ethical judgment and spur moral conduct (2004, 57).

^{31.} In Jones's words, a reason-tracker is "capable of registering reasons and behaving in accordance with them, but it need possess neither the concept of a reason nor have a self-conception. It thus need not have the higher-order reflective capacities characteristic of reason responders" (2003, 190).

^{32.} For an alternative view see Brady (2010). Although Brady defends a perceptual theory of emotion, he criticises the epistemological use of emotion as justifying beliefs.

Let us go back to the main issue with which this section started. I asked whether emotional experiences can go hand in hand with my favoured theory of moral intuition, i.e., seeming theory. My answer is yes.³³ Here is the reason: according to the seeming account of intuitions, moral intuitions are in some relevant ways similar to perceptual experiences that offer non-inferential justification. The quasi-perceptualist account of emotion also treats emotions as non-doxastic states similar to perceptual states that can be assessable for rationality. The quasi-perceptualist account of emotion offers non-inferential justification for moral belief based on emotional experiences. Therefore, moral intuitions and some emotional experiences are similar to perceptual experiences in offering non-inferential justification. Moral intuition and emotion can be partners rather than contestants, with emotion as a source of insight rather than distortion.

To conclude, although moral intuition, emotion and perceptual experience are different, they are at a certain level of abstraction parallel. In the case of moral intuition, we can say that "whereas x has the perceptual experience as if p iff it is translucently sensorily presented to x that p, x has the [moral] intuition that p iff it is translucently intellectually presented to x that p" (Bengson 2010, 92). Likewise, while x has the *perceptual experience* as if p iff it is translucently sensorily presented to x that p iff it is translucently sensorily presented to x that p. X has the *perceptual experience* as if p iff it is translucently sensorily presented to x that p, x has the *emotional experience* that p iff it is translucently emotionally presented to x that p. Of course, emotions *can* be misleading. So, can moral intuitions. So, can perceptual experiences. That they are misleading in some cases does not gainsay that they are sources of knowledge in other cases.

Therefore, the seeming account of moral intuition and the quasi-perceptualist account of emotion offer an integrated psychology and epistemology of moral intuition. These two accounts can explain what a moral intuition is, how emotion can be related to intuition and how each of them can offer non-inferential justification for belief.

Conclusion

I have shown in this paper that Singer's argument is not justified epistemologically. Some empirical results weaken the empirical psychologists' argument against moral intuition. I argued that the seeming account of moral intuition could team up with an account of moral emotion. Not only intuition but also emotion can offer non-inferential justification. The fact that the quasi-perceptualist account of emotion treats emotions as potential (rational) sources of non-inferential beliefs offers a reply to criticisms raised

^{33.} Robert Cowan (2012) also in his PhD thesis defended an account of emotion for moral intuitionism.

by experimentalists that emotions are always distorting factors. Embracing the seeming account of moral intuition and the quasi-perceptualist account of emotion, I can conclude that (i) moral intuitions are intellectual seemings similar to perceptual experiences, (ii) emotional experiences can be similar to perceptual experiences, and (iii) just as perceptual experiences provide non-inferential justification for belief, so do moral intuitions and emotions.

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The False Hope of Deliberate Forgetting: A Critical Response to Proponents of Limited-Use Memory Manipulation

Peter A. DePergola II

University of Massachusetts Medical School College of Our Lady of the Elms

Biography

Dr. Peter DePergola is Assistant Professor of Medicine at University of Massachusetts Medical School, Assistant Professor of Medical Humanities at the College of Our Lady of the Elms, and Director of Clinical Ethics at Baystate Health. He holds secondary appointments at Tufts University School of Medicine, Sacred Heart University, and the American Academy of Neurology.

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The False Hope of Deliberate Forgetting: A Critical Response to Proponents of Limited-Use Memory Manipulation

Peter A. DePergola II

Abstract

The emergence of manipulation techniques that dampen, disassociate, erase, and replace unsavory episodic memories have given pause to even the most ardent proponents of the practice. Supporters of memory manipulation have since clarified that the interventions should be made available exclusively in extreme and limited-use cases. In light of the narrowing of this approach, the present essay examines the arguments in favor of limited-use memory manipulation (LUMM) for the two most commonly-cited circumstances in which the practice is claimed to be justified: post-traumatic stress disorder (PTSD) and substance addiction. After examining the neuroscience of PTSD and substance addition, the critical concepts of biomedicalization and the codification of new diseases, the myth of global autonomy loss, and the terminal normlessness of LUMM are explored to underscore the false hope of deliberate forgetting.

Keywords

Limited-Use Memory Manipulation, Post-Traumatic Stress Disorder, Substance Addiction, False Hope

1. The Case in Favor of LUMM for PTSD

Proponents of LUMM argue that is it morally reasonable, as a last resort, for individuals at risk of severe PTSD to be offered prophylaxis against the condition after enduring exceptionally traumatic and vastly disproportionate circumstances, such as the horrors of brutal rape or the recovery of fellow comrades' bodies (Donovan 2010). Inasmuch as death associated with war is considered morally acceptable in particular circumstances, and the risk of death in war is typically outweighed by any benefits to be gleaned, proponents suggest that helping those who executed a military agenda, risked death and dishonor, and subsequently suffer from a condition associated with their service should be considered an ethical obligation. If it is reasonable, on the one hand, to ask individuals to engage in life-threatening and emotionally distressing activities, then it seems wrong, on the other hand, to deny them therapeutic medications that may significantly reduce their considerable risk of developing PTSD. Moreover, proponents note that objections to the preventative use of beta-blocking pharmacologicals overlook ethical questions about post-trauma debriefing that, they maintain, has little to no effect

and, at worst, increases the risk of PTSD (Bryant 2002). As Wayne Hall and Adrian Carter (2007) maintain, when compared with countless hours of psychological intervention of uncertain efficacy, a seven-day course of a low-toxicity drug seems trivial.

1.1 The Neurobiology of PTSD

Psychological trauma often results from witnessing events that are perceived as life threatening or injurious to self or others (Sherin and Nemeroff 2011). Such experiences, which frequently evoke intense fear, horror, and helplessness, can lead to the development of PTSD. The condition was originally thought to represent a normative response (at the extreme end of the response continuum) to severe trauma or stress. However, it has become clear that the idiosyncratic response of an individual to trauma depends not only on stressor characteristics, but also on factors specific to the individual. For the majority of human beings, the psychological trauma induced by the experience of profound threat is acute and transient. Psychological trauma is typically characterized by phenomena that can be grouped into three domains: (i) reminders of exposure (including flashbacks, intrusive thoughts, and nightmares), (ii) activation (including hyperarousal, insomnia, agitation, irritability, impulsivity, and anger), and (iii) deactivation (including numbing, avoidance, withdrawal, confusion, derealization, dissociation, and depression). Self-limiting by definition, these reactions generally effect minimal impairment over time. For a (significant) minority of the population, however, the psychological trauma brought about by the experience of profound threat leads to a longer-term syndrome that has been defined, validated, and termed "PTSD" in the clinical literature. PTSD is accompanied by devastating functional impairment characterized by the presence of signs and symptoms in the three primary domains mentioned above (Sherin and Nemeroff 2011).

Contemporary neuroimaging has identified and confirmed characteristic changes in brain structure and function in individuals with PTSD (Sherin and Nemeroff 2011). Altered brain regions include the hippocampus, amygdala, anterior cingulate, insula, and orbitofrontal region. Together, these form a neural circuit that mediates adaptation to stress and fear conditioning. Changes in these circuits have been postulated to share a direct link to the development of PTSD. A hallmark feature of PTSD is reduced hippocampal volume. The hippocampus is implicated to control stress responses, declarative memory, and contextual aspects of fear conditioning. In fMRI studies, small hippocampal volumes were associated with trauma severity and memory impairments. The functional role of the amygdala, which mediates stress responses and emotional

learning, is also involved in the pathophysiology of PTSD. Given that increased amygdalar activity has been linked to genetic traits that moderate PTSD, increased amygdala activity may represent a neurobiological risk factor for developing PTSD. The medial prefrontal cortext (MPFC) comprises the anterior cingulate cortex (ACC), subcallosal cortex, and medial frontal gyrus. The medial PFC exerts inhibitory control over stress responses and emotional reactivity through its connections with the amygdala, and mediates extinction of conditioned fear through active inhibition of acquired fear responses. Individuals with PTSD exhibit decreased volumes of the frontal cortex, including reduced ACC volume, which has been similarly correlated with the severity of PTSD symptoms (Sherin and Nemeroff 2011).

The neurobiological concerns observed in individuals with PTSD are numerous and likely reflect an enduring dysregulation of multiple stress-mediating systems that occur as a result of psychological assault (Sherin and Nemeroff 2011). These pathophysiological disturbances occur in individuals with genetic, epigenetic, and experiential predispositions when exposed to extreme conditions, and presumably signify an indelible sensory imprint of maladaptively processed experience that effects an imbalanced degree of emotional import and releases (or restrains) behavioral reactions that aim to defend against future trauma via activation (or deactivation) in a losing effort to secure equilibrium. Hence, a lack of baseline cortisol at the time of psychological trauma may facilitate overactivation in the central corticotropin-releasing hormone - norepinephrine (CRH-NE) cascade, resulting in prolonged and enhanced stress responses. This increased stress responsiveness may be further accented by inadequate regulatory effects of gamma-aminobutyric acid (GABA), serotonin, and neuropeptide Y (NPY). Additionally, altered norepinephrine and stress hormone activity may be involved in processes of learning and extinction, both of which are abnormal in PTSD. For instance, norepinephrine enhances the encoding of fear memories and glucocorticoids block the retrieval of emotional memories. The constellation of elevated noradrenergic activity and relative hypocortisolism may lead to the encoding of traumatic memories and the lack of memory retrieval inhibition, both of which presumably trigger the re-experience of phenomena in PTSD (Sherin and Nemeroff 2011).

Additionally, a malfunctioning hippocampus may account for some cognitive symptoms of PTSD, including declarative memory deficits (Sherin and Nemeroff 2011). Since the hippocampus is critical for context conditioning, an impaired hippocampus may facilitate generalization of learned fear in contexts unrelated to previous traumatic exposure and so impair the ability to discern between safe and unsafe stimuli. In combination with exaggerated amygdalar responses associated with PTSD, a limited

capacity to discriminate threats may promote paranoia, hypervigilance, behavioral activation, exaggerated stress responses, and acquisition of additional fear associations. Disrupted PFC function may then serve to further exacerbate PTSD pathology as a result of deficient suppression of stress responses, fear associations, and extinction. To be sure, some neurobiological findings in patients with PTSD are controversial and require additional examination. Moreover, there are a number of understudied yet significant topics, including factors that impact resilience and vulnerability. For instance, stress-protective neurobiological factors such as activity in oxytocin and NPY-containing circuits could, in principle, be altered to promote resilience. Hence, there exists a general need for molecular biology to further explore PTSD to identify interactions between dispositional factors (both genetic and epigenetic) and trauma exposure to understand PTSD risk, gauge illness course, and predict treatment response. The effects of trauma on neurotrophic factors (in the hippocampus), neural plasticity (central nervous system [CNS]-wide), circuit remodeling (myelination patterns), and gene expression must be assessed in detail across illness duration. While difficult, such studies will necessitate accessing, assaying, and following populations at risk for exposure to trauma before exposure occurs (Sherin and Nemeroff 2011).

<u>1.2 Beta-Adrenergic Receptor-Blocking Pharmacologicals</u> as Treatment for PTSD

Propranolol, a beta-adrenergic receptor antagonist, is the primary pharmacological agent examined for treatment of PTSD (Donovan 2010).¹ This centrally acting, long chain, non-selective beta-blocker is highly protein bound and almost completely absorbed from the gastrointestinal tract with peak concentrations occurring in one to one and a half hours and a half life of approximately four hours (Strawn and Geracioti 2007). Preclinical studies have demonstrated that propranolol-induced beta-blockade in the rodent amygdala blocks memory reconsolidation, suggesting that treatment with propranolol following consolidation of traumatic events might interfere with the amygdalar retrieval of such events and thereby ameliorate unwanted symptoms associated with PTSD (Debiec and Ledoux 2004). Although direct antagonism of norepinephrine signaling may relieve PTSD symptoms, it is possible that propranolol exerts its therapeutic effect in PTSD by regulating substance P – a neuropeptide acting as both a neurotransmitter and neuromodulator system. Like norepinephrine, this pain-

^{1.} While many beta-blocking drugs exist – including some that are more potent and prescribed more frequently than propranolol – the majority of research in this area has employed propranolol.

transmitting neuropeptide is tonically elevated and robustly secreted in response to acute psychological stress in individuals with PTSD. Preclinical data suggest that substance P can be attenuated by beta-antagonists (e.g., propranolol) but not alpha-1 and alpha-2 antagonists (e.g., prazosin). Interestingly, intrathecal administration of substance P to anesthetized rodents induces an increased heart rate that can be blocked by propranolol. Hence, it will be of significant future interest to determine if neurokinin-1 receptor antagonists (i.e., substance P antagonists) prove to be of clinical benefit to PTSD patients (Strawn and Geracioti 2007).

Current PTSD research has employed propranolol in three phases of memory: (i) acquisition, formation, and encoding, (ii) emotional response and consolidation, and (iii) retrieval and consolidation (Donovan 2010). If an event is anticipated as stressful, such as responding to a disaster, the administration of propranolol would influence formation, acquisition, and encoding. Administration immediately following a traumatic event - rape, for instance - would influence response and consolidation. Administration at a later point – for instance, during simulated arousal of PTSD in those who have been diagnosed – may influence recall, retrieval, and reconsolidation. The beta-adrenergic system is involved not only with response and memory formation, but also with the conditioning of emotional responses associated with memory. Hence, propranolol may both dampen memory formation and strip memories of their associated emotional responses. While this treatment has been termed "therapeutic forgetting" (Kolber 2007), it is not designed to make individuals forget physical experiences but rather dissociate emotions and fears from particular memories. Insofar as they slow heart rate and inhibit arterial vasoconstriction, beta-blockers have been administered for years as treatment for hypertension and cardiovascular disease. Although propranolol can interfere with hippocampal centers involved in memory storage – including dampening memory of trauma and enhancing memory of the events preceding it – there have been no reported cases of severe memory loss due to propranolol for cardiovascular conditions (Donovan 2010).

Michael Henry and colleagues (2007) cite multiple studies in which subjects were randomly given propranolol or placebo before exposure to both tragic and emotional stories and neutral and uneventful stories. When subjects were asked to recollect the stories, the placebo group recalled significantly more of the emotional story than the propranolol subjects. Further, there was no difference between the propranolol and placebo groups in recall of the neutral story. Christopher Reist and colleagues (2004) studied thirty-seven subjects who received oral doses of either forty milligrams of propranolol or placebo sixty to ninety minutes before stimulus exposure. The stimulus

was comprised of eleven slides that delineated a brief story. In the mundane version, a young boy witnessed a car accident en route to the hospital to visit his father. Upon arrival, the hospital staff was practicing an emergency drill. In the emotionally-charged version, the boy himself was injured in the car accident and sent to the hospital, where physicians worked to reattach his severed legs. Seven days post exposure, subjects were asked to recall the specific details of the slides they viewed and to take a seventy-sixquestion multiple-choice test that examined memory recollection. Reist and colleagues concluded that propranolol had a significant effect on attenuating memory in subjects who viewed the emotionally-laden story. Additionally, the heart rates of subjects who consumed propranolol were significantly lower than their placebo counterparts. If heart rate is considered a proxy for adrenergic activation, these results substantiate the likelihood that overactivation contributed to PTSD development through disrupted memory consolidation (Reist et al. 2004).

The foregoing data suggest that individuals in the fire, law enforcement, military, and rescue field may benefit from receiving propranolol prior to traumatic stimulus (Henry et al. 2007). However, it is more likely that propranolol would be used in hospital emergency departments to treat patients seeking medical attention shortly after assault, abuse, rape, molestation, or involvement in any sort of accident that may induce severe psychological trauma. Preliminary empirical studies in actual emergency situations have demonstrated the efficacy of propranolol in reducing PTSD symptoms. Roger Pitman and colleagues (2002) studied forty-one emergency department patients who experienced trauma likely to trigger PTSD. Within six hours of the traumatic occurrence, subjects were treated orally with forty milligrams of propranolol; the dose was repeated four times daily for ten days, with a nine-day taper period. After four weeks, symptoms of PTSD were detected in thirty percent of subjects given placebo and eighteen percent of subjects given propranolol. A similar clinical study by Guillaume Vaiva and colleagues (2003) of nineteen subjects demonstrated that thirty-seven and a half percent of those who refused propranolol had PTSD symptoms in contrast to nine percent of those who accepted it. Subjects were treated orally with forty milligrams of propranolol three times daily for seven days, with a twelve-day taper period. Prolonged adrenergic activation, as reflected by greater peritraumatic tachycardia, was prospectively shown to increase the risk for PTSD insofar as these states enhance fear conditioning mechanisms and the overconsolidation of memories related to traumatic events. This suggests that administering propranolol to young, healthy individuals with tachycardia is effective in mitigating PTSD symptoms and (possibly) preventing PTSD (Vaiva et al. 2003).

1.3 The Case in Favor of LUMM for PTSD

PTSD is a growing cause of human suffering that affects approximately onethird of all individuals exposed to major trauma (Hall and Carter 2007). Conventional psychological and pharmacological treatments for PTSD are often expensive, timeconsuming, and of modest efficacy. On this basis, LUMM proponents argue that propranolol may be used, in extreme cases, to reduce the severity of psychological reactions to trauma and thereby reduce the risks of developing PTSD. While reasonable concerns have been raised about the use of drugs to alter memory, many (i) are based on wildly exaggerated and unrealistic scenarios that ignore the restricted and fleeting action of propranolol in affecting memory, (ii) underplay the utterly debilitating impact that PTSD has on those who suffer from it, and (iii) fail to acknowledge fully the extent to which other drugs - such as alcohol - are already used for this purpose. Anterograde amnesia is a well-known side effect of alcohol, as well as benzodiazepines available by prescription, such as Valium and Halcion, and illegally obtained benzodiazepines, such as Rophypnol. Unlike these drugs, propranolol has a retrograde amnesic effect, offering greater potential to ameliorate traumatic memories from the recent past (Kolber 2006). Henry and colleagues offer a scathing critique of the ethical concerns forwarded by the 2003 President's Council on Bioethics (PCB) about the prophylactic and dampening use of propranolol. The authors comment that the PCB's concerns involve a series of speculative harms – for instance, that criminals may consume beta-blockers to reduce painful memories of their crimes - that fail to provide concrete reasons to oppose trials to assess the safety and effectiveness of propranolol. Moreover, the PCB also fails, in their judgment, to make a persuasive case for proscribing the clinical use of propranolol if clinical trials indicate its effectiveness (Henry et al. 2007).

Wayne Hall and Adrian Carter (2007) expand the arguments of Henry and colleagues (2007) to articulate more broadly what is at stake, thereby forwarding the strongest (available) case in favor of LUMM for PTSD. The authors offer a consequentialist argument in favor of using propranolol – namely, that it may be employed to reduce the need for PTSD sufferers to use a more hazardous drug (e.g., alcohol) to treat their symptoms. In high doses, alcohol reduces anxiety and recall of emotionally traumatic memories, but chronic use for these purposes can quickly lead to dependence, a disorder that significantly reduces the chance of recovering from PTSD and has enormous health consequences, both individually and socially (Hall and Carter 2007). Following Henry and colleagues, the authors similarly reject the argument of the 2003 PCB that propranolol may be used by criminals to reduce regretful memories of their crimes, arguing instead that psychopaths cannot express interest in reducing the sting of such memories insofar

as they do not possess the emotional capacity for regret. Nonetheless, in the unlikely event that criminals used propranolol to numb their conscience, a positive outcome might include reduced alcohol abuse,² improved public order, and reduced burden on the families of criminals. Hall and Carter further suggest that concerns about propranolol being used by the military to prevent soldiers from developing painful memories of war crimes and atrocities do not reflect the pharmacological properties of propranolol, which serves to attenuate reactions to trauma rather than procure global amnesia of events and conscience. Somewhat ironically, they mention that atrocities such as those at Srebrenica, Vietnam, and in World War II did not depend on the use of beta-adrenergic antagonists,³ suggesting that the psychology of war appears sufficient to account for such acts attracting strong and justified societal opprobrium in the unlikely event that perpetrators of atrocities use propranolol for these means (Hall and Carter 2007).

In response to the medico-legal argument that damages payouts may be reduced by the effects of propranolol, Hall and Carter comment that this merely signifies the perverse incentives in the legal system rather than a compelling argument against the use of propranolol by victims of traumatic crimes to reduce the severity of PTSD (Hall and Carter 2007). This concern also seems exaggerated, they note, inasmuch as criminal actions that traumatize can be corroborated in ways that do not depend on the memory of the victim or the severity of the PTSD symptoms subsequently developed. For instance, no legal system would acquit a rapist on grounds that the victim did not develop PTSD. Nevertheless, some studies suggest that propranolol may actually improve recall of memories that are impaired by trauma (Strange et al. 2003). Further, Hall and Carter remark that bioethicists who object to the preventative use of propranolol overlook moral questions about the genuine efficacy of post-trauma debriefing, which is purported to reduce the risk of PTSD. According to Richard Bryant, contemporary evidence suggests that, at best, debriefing has no effect and, at worst, increases the risk of PTSD (Bryant 2002). Compared to countless hours of psychological intervention of uncertain efficacy, the authors argue that a seven-day course of a low-toxicity drug seems trivial. Moreover, the use of propranolol to prevent the consolidation of traumatic episodic memories seems a risk worth taking in order to avoid a thirty-three percent chance of spending months undergoing psychotherapy and pharmacotherapy to treat

^{2.} Alcohol is the overwhelming drug of choice for criminal offenders.

^{3.} Ironically, this point may be used a foundation on which their argument may be refuted.

PTSD and the common complications of alcohol and other drug dependence (Hall and Carter 2007).

While Hall and Carter (2007) sympathize with the concerns of Henry and colleagues (2007) regarding the potential for over-promotion of drugs to treat PTSD, they make two observational points in reply. First, they argue that propranolol is already off patent, which makes it exceedingly unlikely to be promoted by any drug company. Second, they argue that while it is plausible that the production of new drugs with similar effects may be promoted in this way in the United States - where direct-to-consumer advertising of pharmaceuticals is allowed and there are few regulatory limits to prevent superfluous promotion - this possibility simply denotes the need for improved regulation of the pharmaceutical industry rather than a robust argument against the use of propranolol per se. In conclusion, they reiterate that most of the commonly raised ethical objections to the use of memory dampening drugs, including propranolol, overstate the possible negative consequences of its use and run the risk of hindering a promising advance in the prevention of PTSD that may significantly reduce the need for PTSD suffers to turn to more harmful drugs, such as alcohol. Moreover, the authors reinforce that conventional arguments against the use of propranolol fail to provide cogent reasons for either preventing a trial of its safety and efficacy or for preventing its clinical use once proven to be safe and effective. For Hall and Carter, then, the criticisms of the PCB should be recognized only as a form of scare-mongering: a hazard of bioethical analyses that is the product of "worst-casing" the potential harms of new biotechnologies, often as a result of exaggerating their effectiveness (Hall and Carter 2007).

2. The Case in Favor of LUMM for Substance Addiction

Proponents of LUMM argue that it is morally permissible, as a last resort, for substance addicts whose psychosocial condition poses a disproportionate and immediate threat to their overall health, well-being, and safety to be offered relief in the form of surgical or psychological memory editing. Impaired control over voluntary behavior is a marked feature in emerging neurobiological explanations of substance addiction, in clinical and diagnostic accounts, and in debates about addiction nosology (Wild et al. 2012). Hence, drug cravings can manifest as such irresistible and powerful psychological forces that someone with an addiction is not capable, at certain times, of acting fully autonomously when the decision involves denying the persistence of cravings. An addict might be excessively subservient to the individual who supplies him with drugs, or with money for drugs, and therefore have his autonomy compromised by the rule of another.

However, if the addict's autonomy is compromised in this way, it marks a consequence of an initial loss of autonomy that is characteristic of addiction (Wild et al. 2012). It follows, therefore, that such a loss of autonomy undercuts the addict's ability to pursue his own goals (Levy 2012).

2.1 The Neurobiology of Substance Addiction

Communication in the brain is facilitated by neurotransmitters that are released from neurons at synapses where they interact as bonds with protein complexes, called receptors, on the surface of other cells, predominantly at the postsynaptic membrane (Duncan and Lawrence 2012). The binding of a neurotransmitter to a receptor transduces a chemical signal that transfers activity-dependent information. The neurotransmitters can either be taken back up by the cell for future use by transporters or degraded and removed from the system. In the brain, pathways are complex integrative systems that contain numerous neurons or nuclei that relay information throughout a circuit and can be acted upon by other neurotransmitter systems that also integrate with that region. While addictive substances have diverse pharmacological profiles, their acute actions converge primarily on the mesocorticolimbic dopaminergic system. This pathway originates in the ventral tegmental area (VTA) and projects to the nucleus accumbens (NAc), striatum, forebrain, and PFC. The PFC coordinates cognitive processes and actions aimed at an internal goal, while the NAc is believed to integrate information, effect an appropriate response, and control the motivational value of stimuli and reward enforcement. Immediately after initial exposure to a drug, extracellular levels of accumbal dopamine increase. Some enhance dopamine release from the presynaptic terminals as a consequence of increased neuronal activity in the VTA (e.g., alcohol, nicotine, opiates, and cannabis) while others inhibit the presynaptic uptake by the dopamine transporter in the NAc (e.g., cocaine and amphetamines). Addictive substances produce a larger dopamine release that is maintained for longer than that of natural rewards. If exposure to the drug persists, there may be a loss of homeostatic regulation: a progressive increase in basal levels of dopamine is accompanied by a reduction in the lesser response to the drug, resulting in the appearance of tolerance to the drug (Duncan and Lawrence 2012).

During acute withdrawal, dopamine rebounds to below basal levels so re-exposure to the drug or a drug-related cue is often sufficient to increase dopamine again (Duncan and Lawrence 2012). This dopamine response has been hypothesized to contribute to addictive relapse, working on serotonergic, noradrenic, glutamatergic, and GABAergic systems. While dopamine release may modulate the acute rewarding effects of an

addictive substance, it does not solely mediate drug-seeking behaviors and persistent drug taking. Exposure to addictive drugs can have either a direct or indirect effect on numerous neurotransmitter systems. Unlike dopamine, which facilitates the response to initial drug use, these additional neurotransmitter systems play a greater role in mediating persistent drug use, contributing to the inability to terminate drug use and the likelihood of relapse after a period of abstinence. Glutamatergic inputs from the PFC, amygdala, hippocampus, and other brain regions modulate activity in the NAc either directly or indirectly by their influence on the VTA. Like to dopamine, initial exposure to a psychostimulant increases extracellular levels of glutamate in the NAc, PFC, and, to a lesser extent, the VTA. Unlike dopamine, however, this response increases the sensitivity of the receptors that bind glutamate to the effects of subsequent exposures to lower doses of the particular drug. This leads to reduced extracellular glutamate levels and, hence, decreased glutamate-driven activity over time. Upon re-exposure to the drug or drug-associated cue, there is enhanced synaptic glutamate release that drives continued drug-seeking behaviors. Such dysregulation of the glutamatergic system is sufficient to alter drug-induced behaviors, even in light of normal dopaminergic responses procured in the NAc (Duncan and Lawrence 2012).

Imbalance in the glutamatergic regulation of corticostriatal transmission has been termed the "glutamate hypothesis" of addiction, which suggests its cardinal role in mediating relapse (Duncan and Lawrence 2012). This hypothesis is supported by studies demonstrating that the reinstatement of drug-seeking behaviors can be prevented using the procysteine drug N-acetylcysteine (NAC) (Reichel et al. 2011). NAC increases glutathione synthesis, which restores glutamatergic signaling. Treatment with NAC is also able to restore prefrontal-driven long-term potentiation and long-term depression in the NAc, which are typically impaired during acute withdrawal. The therapeutic potential of NAC has now been trialed in preclinical human studies, where it has successfully reduced the desire to use drugs of abuse (Gray et al. 2010). Astrocytes express the sodium-dependent GLT1, which is responsible for removing over ninety percent of glutamate from the extracellular space. Overexpression of GLT1 in the PFC and the NAc during extinction training is sufficient to inhibit cue-induced reinstatement to drug self-administration by suppressing the excess extracellular glutamate that normally occurs upon re-exposure to a drug. Beyond relapse, imbalances in glutamatergic transmission have been hypothesized to mediate responses to drugs including selfadministration, reward learning, extinction, and behavioral sensitization that, in animal subjects, is manifested by increased psychomotor activity. In the NAc, the modulation of glutamatergic inputs onto medium spiny GABAergic neurons expressing D₁ dopamine

receptors play a vital role in the development of sensitization to drugs. Thus, an allostatic shift – which marks an adaptive effort in a regulatory system in response to a chronic deviation from "normal," thereby establishing a new set-point – toward augmented glutamatergic function may contribute to the transition from controlled drug use to a compulsive and uncontrolled drug-dependent state and the high incidence of relapse (Duncan and Lawrence 2012).

There are vast numbers of neuropeptides and corresponding receptors present in pathways that mediate addiction. The role of corticotropin-releasing factor (CRF) is highlighted as an example of the intricate part that neuropeptides play in mediating addictive behaviors (Duncan and Lawrence 2012). Stress, either in the environment or due to substance withdrawal, can induce drug craving, which leads to relapse. The system mediating stress responses incorporates the HPA and extrahypothalamic regions (such as the extended amygdala). CRF is a neuropeptide that is responsible for activating the HPA, where it plays a mediating role in hormonal, autonomic, emotional, and behavioral responses to stress. Initial exposure to a drug engages the HPA, but this response becomes blunted with repeated exposures via feedback systems in response to circulating hormones. CFR-mediated actions on addictive behaviors depend on their interplay at extrahypothalamic sites. These extrahypothalamic regions become sensitized to CRF after repeated exposure to substance abuse. During withdrawal, these regions become engaged and hyperactive, thereby increasing local CRF levels and perpetuating negative states of stress. While stress is sufficient to increase CRF levels in the VTA, it is neuroadaptive changes induced by prior drug abuse that enable the CRF to control local glutamate release, subsequently activating the dopaminergic system and perpetuating stress-induced relapse to drug-seeking behaviors. There remains debate about the particular sites of action for CRF beyond the HPA. CRF acts primarily through either CRF1 or CRF2 receptors, both of which are widely distributed throughout the brain. CRF1 receptors have been hypothesized to play a significant role in addiction sensitization and relapse. One study suggests that a CRF1 receptor antagonist was sufficient to decrease the reinstatement of drug-seeking behavior in a previously abstinent rodent that was given cocaine (Przegaliński et al. 2005), although more recent studies support the role of CRF1 receptors in active drug taking (Specio et al. 2008). Chronic inhibition of CRF1 receptors is also sufficient to induce long-term adaptations to the dopaminergic system, including reducing the density of dopaminergic projections in the striatum and increasing dopamine receptor expression in a subtype-specific manner. Comparatively, stress-induced reinstatement to addictive substances can be prevented by infusions of a CRF2 receptor antagonist into the VTA. This most likely indicates inhibition of glutamate and dopamine

release, even through CRF1 receptors are dominant in this region (Duncan and Lawrence 2012).

2.2 Deep Brain Stimulation and False Memory Creation as Treatments for Substance Addiction

DBS is a surgical procedure in which an electrode is implanted in one or more specific areas of the brain and high-frequency electrical stimulation (130-180 Hz) is delivered to target sites (Henderson et al. 2010). This procedure ameliorates symptoms associated with movement disorders and has been moderately effective for intractable pain. The use of DBS is now being extended to include a variety of psychiatric disorders, including obsessive-compulsive disorder and depression. The NAc has a pivotal role in the pathogenesis of substance addiction and is an important element in the mesocorticolimbic reward circuit. As such, it is immediately involved in establishing the reward of drugs of abuse. Numerous researchers now contend that dysregulation of the neurophysiological processes involved in creating the quality or intensity of rewarding experiences contributes to addiction. For these reasons, the NAc is an ideal target for DBS, and early studies have shown promise. DBS in the NAc has selectively blocked the return of psychostimulant use and reduced morphine-induced place preference. For one individual who received DBS to alleviate anxiety and depression, stimulation in the NAc had the unintended consequence of improving the individual's comorbid alcohol dependence (Kuhn et al. 2007). Data from a subsequent animal study indicated brief periods of DBS in either the core or shell of the NAc reduced alcohol consumption in rats trained to drink alcohol. The purpose of the study was to indicate the potential of DBS to reduce human alcohol preference and its deprivation effect. This occurred with no sucrose fading or any other behavioral modification to induce alcohol consumption. Hence, DBS may serve as a solitary or adjunctive therapy for individuals resistant to current treatments for substance addiction (Henderson et al. 2010).

Drug aversion therapies have historically included electroconvulsive techniques (in which an electric shock is used as a negative stimulus pairing when the individual is engaged in thoughts, urges, or behaviors related to the addictive substance), satiation (a technique primarily used with cigarette smokers whereby individuals smoke a large number of cigarettes in a short period of time to induce nicotine toxicity), and chemical aversant pairings (in which a repugnant smell or taste, or even an intravenous pharmacological agent, is administered to induce sickness) (Clifasefi 2013). Ethical concerns, as well as a lack of controlled scientific studies in these areas, have led to the

demise of conventional aversion techniques. Nevertheless, some drug programs still integrate aversion therapy in their methodologies. Current (acceptable) pharmacological treatments for substance addiction include the administration of inhibitory agents (e.g., Disulfiram) that act by blocking the breakdown of acetaldehyde, the chemical believed to contribute to withdrawal symptoms. The interaction of Disulfiram with any amount of an addictive substance enhances unpleasant physical symptoms – including throbbing headache, nausea, vomiting, and weakness – deterring the individual from subsequent use. Today, an alternate approach to curbing substance addiction can be found in the pseudomemory literature. Over the past twenty years, the literature on FMC has suggested the possibility of having individuals imagine an event that purportedly happened in their past through innocuous suggestions and eventually believing (with confidence) that the event occurred (Clifasefi et al. 2013).

Results from a handful of FMC studies have indicated that adopting false memories as part of one's personal autobiography can affect an individual's current and future preferences related to those memories (Clifasefi et al. 2013). These findings demonstrate promise for related behaviors that carry devastating health risks, such as substance addiction. To date, only one study has experimentally examined whether early substancerelated memories would be prone to memory manipulation. Seema Clifasefi and colleagues (2013) suggested to their trial participants that they had become sick during their early teenage years (prior to age sixteen) after exposure to a particular type of drug, and examined whether they would (i) increase their confidence that the suggested event occurred and, if so, (ii) demonstrate a decreased preference for the specific drug mentioned. Overall, experimental participants who received a false substance-related suggestion exhibited a significant increase in confidence compared to controls that the event did occur. More significantly, individuals who received a false suggestion that they had become sick from a particular drug showed a trend toward diminished preference for the drug in a follow-up preference rating task. Taken together, false memories about becoming sick from a specific drug in one's young adulthood appears to have implications for an individual's current and future associations with that drug. The findings of Clifasefi and colleagues are consistent with the drug expectancy literature, which indicates that positive drug expectancies are associated with increased and risky drug-related behavior, whereas negative drug expectancies are associated with decreased drug-related behavior (Clifasefi et al. 2013).

To be sure, the 2013 study by Clifasefi and colleagues is not without limitations, five of which are particularly worthy of note. First, it is important to illuminate that only 19.6 percent of experimental subjects developed a memory or belief that the drug-

related memory occurred. Second, the fact that disparities existed between experimental and control participants at baseline vis-à-vis drug preference does not preclude the possibility that preference findings are due to regression to the mean. Third, the data suggests that those who reported a younger first drug-related experience were more likely to adopt the false suggestion. Fourth, it can be argued that insofar as early onset drug users are known to be at higher risk for subsequent problems, these individuals may ultimately be remembering true events from their past. Finally, another argument can be made about early age-of-onset drug use - namely, that these individuals might show different cognitive vulnerabilities than their late(r) age-of-onset counterparts. These limitations notwithstanding, the foregoing data suggests that, in some cases, preference for a particular drug may be altered via FMC. Thus, drug-related memories evoked about one's past (whether true or false) have particular consequences for one's current thoughts, preferences, and, ultimately, drug-seeking behavior. Moreover, the finding that individuals who reported a younger first drug experience were more likely to adopt the false suggestion may be of particular interest to addiction researchers given what is known about the connections between age of first drug experience and subsequent development of drug dependence. Ralph Hingson and colleagues (2006), for instance, have demonstrated that individuals who were exposed to an addictive substance prior to age fourteen are approximately five times more likely to experience dependence compared to those exposed at age twenty-one or older. In a similar vein, the study of Clifasefi and colleagues highlights additional cognitive characteristics of individuals who may be at risk for developing drug problems (Clifasefi et al. 2013).

2.3 The Case in Favor of LUMM for Substance Addiction

Addictive behaviors clearly undermine individual and population health and exact a significant economic cost on global societies (Wild et al. 2012). Clinicians, researchers, policy makers, and society at large are therefore eager to implement effective policies and programs to reduce the medical and economic burdens of addiction. Treatment is one important response to these burdens. Addiction treatment programs have traditionally engendered the view that patients are sufficiently impaired and concerned by their addictions to seek help voluntarily. However, the case-mix has shifted dramatically over time, and mandatory treatment pathways are becoming increasingly entrenched in addiction treatment programs and policies around the world. These pathways include legal mandates from the criminal justice system, formal mandates from employers and social assistance agencies, and informal mandates (e.g., threats, ultimatums,

interventions, etc.) issued by family and friends, all compelling individuals with addiction to seek treatment. Mandated treatment policies and programs have been viewed as costeffective and rehabilitative adjuncts to voluntary treatment and, on this basis, justifiable public health measures similar to seatbelt laws or mass immunization programs. The rationale for mandatory addiction treatment has recently been broadened to underscore findings from neuroscience research. Evidence of impairment in decision making and behavioral control in individuals with histories of substance abuse has been used to argue that individuals with such neurocognitive affliction are not capable of informed consent. Some scholars have expanded this argument by proposing that mandated addiction treatment should be used to restore patient autonomy and, to this end, can be justified according to a fundamentally humanitarian moral calculus (Wild et al. 2012).

Impaired control over voluntary behavior is a marked feature in emerging neurobiological explanations of substance addiction, in clinical and diagnostic accounts, and in debates about addiction nosology (Wild et al. 2012). There is growing evidence that chronic, sustained drug abuse is associated with neurocognitive changes and deficits, as revealed by neuroimaging studies (Bolla et al. 2003) and neuropsychological testing (Ersche and Sahakian 2007). Several studies propose that chronic exposure to drugs sets in motion neurobiological processes that result in overvaluing the reinforcing properties of a substance or behavior and an undervaluing of natural reinforcers (e.g., maintaining relationships, going to work, etc.) (Goldstein and Volkow 2002). These processes are associated with impaired voluntary control over one's behavior. Similarly, individuals experiencing addiction have neurological impairments that weaken their ability to make voluntary decisions in service of long-term outcomes. Despite cautionary assertions concerning the difficulty of making substantive generalizations or conclusions about the neuropsychological and neurobiological correlates of chronic drug use – due largely to the fact that findings are not always consistent in the nature or extent of deficits observed - results from neuroscientific studies have been used to argue that treatment is able to restore free will (Caplan 2008). This suggests that drug cravings can manifest as such irresistible and powerful psychological forces that someone with an addiction is not capable, at certain times, of acting fully autonomously when the decision involves denying the persistence of cravings (Wild et al. 2012).

Autonomy is a term with multiple meanings. In its maximal sense, autonomy means that human beings possess only the desires and beliefs they want to have and make choices uninfluenced by any factor they have not endorsed (Levy 2012). Certainly, if addiction threatens autonomy (as it seems to do), then it must be some less extravagant notion of autonomy that it undermines. In a minimal sense, autonomy is simply self-

government. Just as autonomous nations are able to make major decisions of internal and external policy without undue interference from foreign powers, so autonomous persons are capable of governing themselves by setting their own short- and long-term ends and choosing the best means of achieving them. One obvious situation in which autonomy is compromised or lost is when the self is ruled by another. In the political domain, the loss of autonomy is almost exclusively described this way. The same kind of phenomenon can occur, more or less dramatically, in the substance addict as well. A slave, for instance, whose life is entirely in the hands of another, is a dramatic example of this phenomenon, while a dispositionally subservient person might represent a less dramatic instance of this partial loss of autonomy. An addict might be excessively subservient to the individual who supplies him with drugs, or with money for drugs, and therefore have his autonomy compromised by the rule of another. However, if the addict's autonomy is compromised in this way, it marks a consequence of an initial loss of autonomy that is characteristic of addiction. This initial loss of autonomy has left the addict vulnerable to this subservience, since it is the addiction that gives the individual who controls him undue influence (Levy 2012).

There need not be another party exercising undue influence over the addict to experience a weakening of autonomy. The individual who is able to supply his habit is unlikely to be at the control of another as the consequence of addiction (Levy 2012). It is sometimes postulated that addicts are controlled by the drugs they abuse. Carl Elliot (2002), for instance, writes that the addict must go where addiction leads, because the addiction "holds the leash" (p. 48). Elliot's imagery is, of course, a metaphor: an addiction cannot hold a leash, is not an agent, and has no desires or goals of its own. If addiction involves the loss of autonomy, then it must somehow undercut the addict's ability to pursue his own goals. Elliott's claim that addicts are in thrall to their addiction echoes a long tradition of theorizing about addiction – namely, that addiction exercises complete control over drug-seeking and consuming behavior – found in the writings of philosophers, psychologists, and clinicians. For Louis Charland (2002), for instance, the addicted brain "has almost literally been hijacked by the drug" (p. 43); for Alan Leshner (1999), the initially voluntary behavior of drug-taking gradually transforms into involuntary drug-taking to the point where behavior is subsequently driven by compulsive cravings for the drug; and for Harry Frankfurt (1971), unwilling addicts struggle against their desires to no avail insofar as they are always "helplessly violated by their own desires" (p. 12). For these authors, addiction is compulsive, which is to say that addicts are forced to act as they do by virtue of an irresistible desire. Desires are irresistible when they become powerful enough to overwhelm an individual's capacity to overcome

or circumvent them. Thus, addiction is compulsive inasmuch as it produces desires that are so powerful that an addict cannot resist them (Levy 2012). This conception of how addiction functions dates back (at least) to William James (1890), who commented that "if a bottle of brandy stood at one hand and the pit of hell yawned at the other, and I were convinced that I should be pushed in as sure as I took one glass, I could not refrain" (ch. XXVI).

3. The Neuroethical Astigmatism of LUMM

Beta-blocking pharmacologicals, DBS, and FMC techniques used to block (i.e., blunt or dampen) or reverse (i.e., erase) the cognitive processes through which nonconscious recollections of past events deemed pathological and found to exacerbate PTSD and substance addiction are currently offered as treatments for specific diseases of mentality. Intended as prudent therapies, these treatments are widely experimental in the context of targeted manipulation and therefore transcend the respective purposes for which they were originally designed. Due to the experimental nature of their implementation, the long-term effects of their novel application are widely unknown. While the potentially harmful neurocognitive and more general biological effects already suggest their restriction from general use, this essay contends, for reasons beyond these implications, that even the most limited forms of neurocognitive manipulation cannot be justified as a morally licit biomedical practice, and that arguments in its favor are acutely neuroethically astigmatic.

<u>3.1 The Astigmatism of LUMM for PTSD:</u> Biomedicalization and the Codification of New Diseases

The primary neuroethical astigmatism of LUMM as a treatment for PTSD concerns the potential for unsavory memories to become medicalized and subsequently codified as a new disease category. A lingering effect of contemporary biomedical technologies is the medicalization of what has heretofore been considered "normal" states of being (Henry et al. 2007). Sociologists in the 1970s and 1980s defined medicalization as descriptive of at least two processes: first, placing what had previously been considered "normal" behavior under the medical gaze (Parsons 1979), and second, taking something deemed by society as pathological and placing it under the jurisdiction of medicine (Conrad and Schneider 1980). In recent years, new processes of biomedicalization have expanded the diagnostic conditions of illness to include more symptoms and greater numbers of individuals. This expansion is exemplified by cases of clinical depression and bipolar disorder, and it is

particularly evident in the extension of attention deficit hyperactivity disorder (ADHD) to include greater numbers of children and a growing adult population. The expansion of diagnoses is encouraged and promoted by pharmaceutical companies that produce drugs to treat disorders with the intention of codifying new disease categories. In turn, pharmaceutical companies sponsor disease awareness campaigns, advertise prescription drugs directly to consumers, and target clinicians at educational conferences and in medical offices to encourage them to prescribe their drugs. Sometimes referred to as "disease mongering" (Moynihan and Henry 2006), this newer process of medicalization allows pharmaceutical companies to capitalize on human suffering and exploit insecurities and unhappiness in order to increase drug sales (Henry et al. 2007).

Propranolol in particular seems especially ripe for pharmaceutical rebranding (Henry et al. 2007). A pharmaceutical company that wishes to manufacture and market a newer beta-blocker for the treatment of PTSD need only slightly alter its chemical composition to obtain a new patent and market the drug under a new name. It might, for example, promise fewer side effects, or longer-lasting effects than generic propranolol. The company responsible would then be able to brand the "new" (and likely more expensive) drug and market it with a new patent for the "new" ability to prevent PTSD. Granted this, various scenarios become possible. For instance, patients would be made aware of and offered the drug in the aftermath of a traumatic event. To sell more drugs, the company would specify a range of traumatic events for which its drug should be prescribed: rape, violent crimes, death of a loved one, and the like. Here, medicalization processes come into play. Trauma - its conception, parameters, and definition - is equal parts cultural and social, not medical. Yet the definition of trauma would be codified by the FDA through its indications for use of the new drug, and the pharmaceutical company that manufactures it may continually broaden the scope of trauma in order to sell more of its product. Take, for example, a drug advertisement in which an individual is encouraged to ingest propranolol following an embarrassing or humiliating experience at the office. This quixotic yet sobering example provides a substantive reason to be concerned that a private company seeking to sell more drugs will promote an expanded set of PTSD causes, altering both a sense of the illness and interpretations of the experiences that may cause it (Henry et al. 2007).

Moreover, the foregoing concern seems particularly acute in terms of employing the new drug as a prophylactic to trauma. Although the PCB (2003) has focused chiefly on the preventative uses of propranolol for military or emergency rescue teams, the company producing a new drug for PTSD would presumably attempt to market directly to consumers (Henry et al. 2007). Assuming the FDA approves the drug for this use,

questions are inevitably raised over the breadth and depth of traumas for which the new drug is appropriate. This essentially social question would then become defined primarily by the pharmaceutical company. If the new drug is marketed as prophylactic, it would be advertised to consumers who may be exposed to trauma in the near future. It may eventually become tempting for all individuals to have the new drug on hand for consumption before or after trauma, idiosyncratically defined. Falling in line with methylphenidate for ADHD and selective serotonin reuptake inhibitors for depression diagnoses, propranolol may be positioned as another catalyst of "diagnostic bracket creep" (Kramer 1993, 15), in which the availability of a new drug encourages the expansion of a diagnostic category. This is complicated further by the added nebulous category of "prevention" rather than treatment where the potential for expansion is even greater. If modern history has demonstrated anything, it is that scientific breakthroughs are often double-edged swords. However, if the PCB's language of "evildoers" and "pain" that is "deserved" has resonance at all in high political circles, it has little utility in the scientific and rational evaluation of new medical technologies and their potential dangers (Henry et al. 2007).

In addition to ethical qualms about biomedicalization and the codification of new diseases is the issue of capacity and, thus, informed consent (Henry et al. 2007). It is hardly controversial to question the capacity of research subjects or medical patients to give informed consent in the immediate aftermath of severe psychic trauma. While victims of rape and witnesses to murder are generally assumed to have decisional capacity to accept diagnostic and forensic tests (as well as psychotherapeutic and psychopharmacologic interventions), the use of propranolol as a targeted method of manipulation would require healthcare professionals to accept a lower threshold of capacity. However, researchers or clinicians utilizing this method must take decisional capacity seriously if they wish to maintain minimal treatment standards. If an individual is judged to be devoid of the ability to understand, evaluate, and reason about relevant information (whatever the cause), then this precludes the individual from free participation in PTSD research. No risk, however small, should be imposed in these circumstances. The prevention of PTSD with propranolol does not constitute a medical emergency as it has been traditionally defined - that is, when the consequence of withholding a particular treatment is that death will ensue, or the patient's health will be substantially compromised. If, on the contrary, the prevention of PTSD were to become understood as an emergent circumstance (as defined above), then patients with capacity who refuse propranolol or whose surrogates consent for them would be physically forced or psychologically coerced into taking the drug against their will. In addition to this being

an unjustifiable form of paternalism, such forceful and counterintuitive behavior would likely place an additional psychic burden on an already vulnerable person (Henry et al. 2007).

<u>3.2 The Astigmatism of LUMM for Substance Addiction:</u> <u>The Myth of Global Autonomy Loss</u>

The primary neuroethical astigmatism of LUMM as a treatment for substance addiction concerns the myth that individuals with addiction suffer a global loss of autonomy that renders them incapable of acting freely. Notwithstanding its popular appeal, this characterization of addiction seems to be false (Levy 2012). While addiction undoubtedly produces powerful desires, there is ample data to suggest that it is not strong enough to overwhelm individuals in the aforementioned manner. Strictly speaking, the strength of a particular desire can be measured by examining the behavior of individuals who are subject to it. It is precisely this test for strength that underlies the claim above: proponents of the global loss of autonomy conception argue their position by highlighting the lengths to which addicts will go in order to procure drugs. Addicts will engage, they suggest, in degrading and risky activities, including stealing and lying. Moreover, addicts will spend time and effort not only in pursuit of drugs, but also in attempts to stop consuming them. This latter endeavor indicates that, irrespective of what else is true of them, addicts genuinely desire (on many occasions) to refrain from acting on their addiction. However, though proponents of the global autonomy loss myth are correct to hold that behavioral evidence unmistakably indicates that addicts have impaired autonomy, addiction behaviors do not fit the profile expected when subject to irresistible desires. Individuals with the capacity for voluntary action who are subject to the irresistible desire to achieve a particular goal will pursue it across a broad range of circumstances, realistic and unrealistic alike. Hence, only a countervailing incentive that is itself of comparable power can limit or prevent the behavior (Levy 2012).

To be sure, the fact that an addict might refrain from using a drug in front of law enforcement personnel is not evidence of a resistible desire; however, were the addict to refrain for much smaller incentives – for instance, in order to spend money on food (while not at risk of starvation), or in order to schedule it for a more convenient time – this would mark resistible compulsion (Levy 2012). Contemporary evidence patently demonstrates that addictive behavior is sensitive to incentives that are not extraordinary in nature, and that it is not therefore subject to irresistible desires. Joanne Neale (2002) has highlighted the affect of price on drug quantity consumed by addicts, and

Herbert Fingarette (1988) reports that alcoholics exhibit sensitivity to cost even after a priming drink. Moreover, when a powerful reason to abstain is personally accepted and support is steadfastly provided throughout the withdrawal process, many addicts succeed in overcoming their addiction. New mothers, for instance, are frequently able to conquer their addiction in order to better care for their child. Gene Heyman (2009) has emphasized that addicts can be treated through the constructive of positive and negative behavioral incentives. Heyman draws heavily on the work of Stephen Higgins and colleagues (1994), who have successfully used rewards (in the form of vouchers) in the treatment of cocaine addiction. In a series of experiments, vouchers were paid to addicts in return for clear urine tests, with the value of each voucher increasing over time if the participant remained abstinent. The value of the vouchers did not exceed twelve dollars in United States currency, and was sometimes significantly lower than this figure. As Heyman notes, this is considerably less than the subjects were routinely spending on cocaine, yet the treatment modality was effective in encouraging the majority to abstain (Levy 2012).

The foregoing indications suggest that addicts are not subject to irresistible desires that entail a global loss of autonomy. Some evidence suggests that individuals with addiction may not be subject to desires to use drugs at all, at least on one understanding of the nature of desire, according to which human beings requisitely have positive attitudes toward desired objects (Levy 2012). Drugs may apparently be "wanted" - that is, they may possess a high incentive salience - without being "liked" at all (Robinson and Berridge 2003). David Balfour (2004) has identified the neural basis for this dissociation between the causal strength of a desire and the liking of its object as a consequence of the effects of dopamine on different regions of the NAc. One region is involved in the subjective feelings of reward associated with the drug while the other confers incentive salience on the stimulus independently of its being pleasurable. Heyman utilizes Balfour's study as a basis for claiming that addiction is a "disorder of choice" (Heyman 2009). By this phrase, he indicates that (i) addiction is a syndrome in which choice is disordered, but also that (ii) addiction is a syndrome in which dysfunctional behavior is chosen. At least prima facie, this conclusion seems to imply that individuals ought to treat addictive behaviors in the same way as other voluntary actions and hence to regard them as freely chosen and morally irresponsible, worthy of condemnation and punishment. Although Heyman's line of thought is alluring, this essay rejects it as acutely shortsighted. Autonomy manifests in degrees: it is not an all-or-nothing phenomenon. An individual may be capable of choice and suffer from diminished autonomy. While Heyman is technically correct to hold that addicts choose to act as they do, he fails to recognize

how severely impaired their autonomy to choose is. Addicts need not be in thrall to anyone else, but it is clear that they fail to adequately govern themselves. Addicts experience great difficulty in imposing their will on themselves, not in the manner that myth proponents imagine (i.e., because they feel forced to act, against their will, by overwhelming desires), but because although they may identify with their moment-tomoment choices, they cannot effectively pursue future plans and projects (Levy 2012).

Despite the fact that some individuals are more vulnerable to addiction than others (as suggested by the high heritability of substance abuse disorders), modern neuroscience has produced a substantial corpus of material on changes in the brain that together suggest that the discount curves of addicts alter as a consequence of the chronic use of addictive substances (Levy 2012). There is evidence that stimuli associated with substances to which an individual is addicted are highly motivating in ways that bypass capacities for conscious control. The motivational salience of a cue for the consumption of any good seems to be encoded as, or caused by, a surge in dopamine from the VTA. As individuals habituate toward a reward, this dopamine signal tends to attenuate. This attenuation fails to occur with regard to drugs of addiction, which may explain why their motivational salience increases even while the degree to which individuals prefer the drug tends to fall. Dopamine causes a heightened focus on predictors of reward and primes the motor system for action, leading to judgments that are difficult to revise and behavior that is difficult to inhibit. While these mechanisms cause judgments and behavior that would be strenuous for a well-functioning person to inhibit, addiction causes neuroadaptations that weaken the efficacy of the frontal mechanisms that regulate behavior. These neuroadaptations explain why addicts who sincerely wish to abstain from drug use nevertheless find it extremely difficult to prevent positive responses to drug-related cues. These neuroadaptations also explain the behavioral inconsistencies characteristic of addiction. Work in social psychology has demonstrated the existence of what may be a separate pathway whereby addicts find themselves oscillating between preferring abstention and preferring consumption (Baumeister 2002). Research on this phenomenon, known as "ego depletion," suggests that cognitive resources that individuals use to assess their options and inhibit prepotent responses are depletable. Utilizing these faculties leaves fewer available for subsequent self-control tasks and, hence, makes such tasks additionally cumbersome. In turn, ego depletion gives rise to the oscillation in preferences observed in addiction: when self-control resources are plentiful, the individual judges that abstention is best; when these resources are depleted, the individual experiences a judgment shift in favor of consumption (Levy 2012).

3.3. The Neuroethical Case Against LUMM: The Normative Demands of Proportionate Reason

For reasons beyond the unsavory implications of biomedicalization and the myth of global autonomy loss, this essay contends LUMM cannot be justified as a morally licit biomedical practice within the confines of a comprehensive normative ethical framework. The application of Richard McCormick's (1985) threefold criteria of proportionate reason can serve to illuminate the normative astigmatism of LUMM and the essay's corresponding endeavor to correct it. However, before an adequate moral assessment of an action's proportionality can be made, its effect on all ends and values must first be weighed. Moral values can be considered and a final decision made only after all values have been compared (Curran 1970). It is this systematic weighing of moral values, for instance, that has made noncombatant immunity a virtually exceptionless moral rule. The strength of moral norms touching concrete conduct is an elaboration of what is judged - within a particular culture, with a particular history, based on a particular experience - to be proportionate or disproportionate. Proportionality is always the criterion where actions cause damage, and neurocognitive memory manipulation involves both personal and social damage. The corrective vision provided herein attempts to halt the narrowlyconceived notion of proportionality embedded in the arguments of LUMM proponents (McCormick 1985).

If there exist norms that are teleologically established and yet are virtually exceptionless,⁴ the remaining task is to clarify the metaethical assertions in view of which those norms are held as exceptionless. This task includes nondemonstrable calculations – prudential judgments based on the certainties of history and the uncertainties of the future. The sense of what individuals ought and ought not to do is therefore informed by past experience and agnosticism with regard to future behavior and its long-term effects. This suggests that where norms are viewed as virtually exceptionless, it is because of the prudential validity technically referred to as *lex lata in praesumptione periculi communis:* a law established on the presumption of common or universal danger (McCormick 1985). The notion of presumed universal danger is frequently associated with positive law. That is, even if the action in question does not threaten the individual personally (though LUMM does), there remains the further presumption that to allow individuals to make that decision for themselves poses a threat to the common good (which LUMM also does). Hence, the ethical impetus to retain autobiographically accurate, emotional rational, and narratively authentic memories can be viewed in a way analogous to the

^{4.} For instance, the direct destruction of noncombatants in warfare.

exceptionless character of norms such as noncombatant immunity. The risk in alternative policies is simply too great. In the context of moral development, autobiographical, emotional, and narrative memories are enormous goods at stake. Past experience of human failure, inconsistency, and frailty, along with uncertainty regarding long-term effects of such irreversible actions as dampening or erasing human memories, suggests that societies should continue to hold some norms - such as authentic self-knowledge – as virtually exceptionless. That is the conclusion of prudence in the face of dangers too grave to make risk tolerable.

For McCormick, proportionate reason (for permitting the occurrence of harm otherwise judged as illicit within a normative moral calculus) means three things: (i) the value at stake is at least equal to the value being sacrificed; (ii) there is no less harmful way to protect the value here and now; and (iii) the means used to protect the value (here and now) will not undermine it in the long run (McCormick 1985). Conversely, an action is disproportionate if (i) a lesser value is preferred to a more important one; (ii) harm is unnecessarily caused in the protection of a greater good; or (iii) in the circumstances, the manner of protecting the good will undermine it in the long run. To determine if an action involving harm is proportionate in the circumstances, one must judge whether the specific choice is the best possible service to all values in the difficult and, in the context of PTSD and substance addiction, tragic circumstances. What constitutes the best promotion of all values in the circumstances will, of course, depend on how one defines and understands the circumstances. An adequate account of the circumstances indicates not simply how much quantitative good can be salvaged from an individual conflict of values, but also the weight and balance of social implications and reverberating aftereffects insofar as they can be foreseen. This account will test generalizability, consider cultural climate, draw from historical wisdom, seek guidance from others, and distance itself from self-interested tendencies. In sum, the criterion of proportionality is found within the ordo bonorum, which determines the good one ought to do and serves as the objectively licit character of one's activity. So informed and organized, individuals do all that can be expected of them (McCormick 1985).

Before applying McCormick's first criterion of proportionality – namely, that the value at stake is at least equal to the value being sacrificed – to the action of LUMM (McCormick 1985), it is necessary, first, to identify both the value at stake and the value being sacrificed in the circumstances of LUMM. The strongest proponents of LUMM are likely to define the value at stake as individual (and, in turn, social) health, well-being, and safety (which has been compromised by disproportionate psychosocial conditions including, but not limited to, PTSD and substance addiction). This essay defines the

value being sacrificed as individual (and social) autobiographical memory, emotional rationality, and narrative identity – elements that together comprise the ability to seek, identify, and act on the good. There is no doubt that individual (and social) health, wellbeing, and safety are massively significant values. However, as LUMM proponents fail to discern, these values depend almost exclusively for existence on some manifestation of the interplay between memory, emotion, and identity. If overall health, well-being, and safety are largely contingent on the capacities to understand (employing memory), evaluate (employing emotion), and reason (employing identity), then LUMM does not meet McCormick's first criterion of proportionality. Indeed, the value at stake is not equal to the value being scarified.

McCormick's second criterion of proportionality requires that there exists no less harmful way to protect the value here and now (McCormick 1985). Applied in the context of LUMM, the criterion becomes thus: there exists no less harmful way to protect the value of individual (and social) health, well-being, and safety than to annihilate the memories that are presumed to be responsible for perpetuating disproportionate psychosocial conditions (including, but not limited to, PTSD and substance addiction). This claim is an enormous stretch, even in light of most aggressive and debilitating psychosocial conditions. Moreover, it is based on the false premises that (i) memories are solely or even primarily responsible for perpetuating psychosocial conditions, and (ii) memories are independently and immutably morally charged. Neither of these claims carry any neurobiological or neuroethical merit. Lastly, if the value being scarified is defined as individual (and social) autobiographical memory, emotional rationality, and narrative identity - elements that, again, collectively comprise the ability to seek, identify, and act on the good – then it is difficult to imagine a more harmful way protect the value here and now than to utilize LUMM to do so. In light of the abilities of intensive psychotherapy and the proportionate use of rebalancing pharmacologicals (when utilized to their fullest potential),⁵ LUMM does not meet McCormick's second criterion of proportionality. Indeed, there exists a drastically less harmful (and impermanent) way to protect the value here and now.

McCormick's third criterion of proportionality requires that in the circumstances, the means used to protect the value here and now will not undermine it in the long run (McCormick 1985). Applied in the context of LUMM, the criterion becomes thus: in the circumstances of threatening psychosocial conditions, the means of LUMM used

This oversimplified statement is meant to include participation by those with addiction in the many historically-successful 12-step recovery programs.

(here and now) to protect the value of individual (and social) health, well-being, and safety will not undermine it (i.e., individual [and social] health, well-being, and safety) in the long run. Here, the neuroethical astigmatism of LUMM proponents is most acutely evident. Proponents of LUMM frequently couch their arguments in what they believe would result from the redemptive practice of LUMM: the restoration and reinstallation of autonomy once plundered by debilitating and disproportionate psychosocial conditions. By itself, the restoration and reinstallation of autonomy is a noble and desirable goal for any treatment. As mentioned above, if the consequence of certain psychosocial conditions involves the loss of autonomy, then the conditions(s) must be viewed to somehow undercut the individual (and social) ability to pursue goals. This presumes, however, that the pursuit of individual (and social) goals – which depends for existence on the capacities to (i) recall (through memory) and (ii) act (through informed and intentioned will) on them - will somehow be resurrected by annihilating the very faculty (i.e., memory) that makes the pursuit possible and, more importantly, morally responsible. However, goals are always specific; they cannot exist apart from individuals and societies who espouse them, and they depend for definition, therefore, on the characteristics those individuals and societies possess – characteristics that are, no doubt, very different from other individuals and societies.

A standard understanding of autonomy refers to the freedom individuals (and societies) ought to enjoy to choose their own way in life and to make their own decisions within moral limits. Proponents of LUMM contend there is no more immediate and humane way, in extreme circumstances, to restore and reinstate lost freedom than to dampen or erase the memories that seem to imprison it. For them, LUMM marks a bridge for individuals (and societies) bound by the devastating effects of psychosocial disorders to once again be free to act freely. A first blush, this position is tempting and intoxicating, but it ultimately proves astigmatic and impossible. Societies have long nuanced the notion of pure autonomy to preclude the freedom of its members to simply do as they wish. This is exemplified in the rejection, for instance, of strictly utilitarian calculi and purely consequentialist logistics. Against the notion of pure autonomy, this essay suggests that a more adequate understanding of autonomy is not fundamentally concerned with the freedom to do as one wants, but with the freedom to do as one ought in light of one's moral responsibilities.

If this nuanced notion of autonomy is persuasive, then it raises the question of how individuals can decipher what they have a moral responsibility to do. As the central thesis of this essay holds, the answer is determined by one's narrative identity, the sum of one's autobiographical memory and emotional rationality. The "autonomous ought"

can therefore exist only in light of an idiosyncratic narrative. Hence, only within an idiosyncratic narrative structure can one determine one's future "oughtness" – the pull of moral responsibility grounded in and determined by the story of one's life and the values and commitments that comprise it. Conceived of concretely, the "autonomous ought" is what separates an individual's lack of desire to help the child in front of her from the responsibility to help the child in front of her because this child is her child and she is this child's parent. This structure of identity, which serves as the basis for determining the good and one's responsibility to act on it, is irreparably damaged by memory manipulation, even in its most limited forms and exceptional applications. For this reason, LUMM does not meet McCormick's third criterion of proportionality. Indeed, in the circumstances, the means used (here and now) to protect the value ultimately undermine it in the long run.

Conclusion

This essay has offered a critical response to proponents of LUMM. Part 1 examined LUMM for PTSD, and included a specific analysis of the neurobiology of PTSD and betaadrenergic receptor-blocking pharmacologicals as treatment for the disorder. It concluded by identifying the strongest possible case in favor of LUMM for PTSD. Part 2 explored LUMM for substance addition, and included a specific analysis of the neurobiology of substance addiction and DBS and FMC as treatments for the disease. It concluded by proffering the strongest possible case in favor of LUMM for substance addiction. Finally, Part 3 evaluated the neuroethical astigmatism of LUMM, and included a specific analysis of biomedicalization and the codification of new diseases, as well as the myth of global autonomy loss. It concluded by proposing that LUMM violates the normative demands of proportionate reason.

The evidence provided in this essay supports the conclusion that interventions to dampen, disassociate, erase, and replace episodic memories of trauma and addiction ultimately undermine one's ability to seek, identify, and act on the good. As such, memory manipulation, even in its most limited forms, cannot be ethically justified as a licit medical practice.

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Implications of the Inverted U Phenomenon for the Bioethical Principle of Justice in the Context of Pharmacological Cognitive Enhancement

Mijail Alejandro Tapia Moreno

Bioética y Neuroética clínica, Universidad Anáhuac México Norte

Biography

Mijail Alejandro Tapia Moreno is a research associate at the Bioética y Neuroética Clínica, Universidad Anáhuac México Norte in Mexico.

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Implications of the Inverted U Phenomenon for the Bioethical Principle of Justice in the Context of Pharmacological Cognitive Enhancement

Mijail Alejandro Tapia Moreno

Abstract

At the present time there is a boom in the use of pharmacological cognitive enhancers (PCEs) particularly within an academic and labor context. Numerous objections to the use of this medicines arise in the context of Neuroethics, being one of the most important, the principle of justice. Among the most prevalent arguments put forward it is noted the disturbance of distributive justice and competitive fairness. Succinctly it is established that hypothetical PCEs without adverse effects could promote the social fragmentation by favoring economically dominant classes. However, it has been experimentally observed that PCEs present benefits ruled by the inverted U phenomenon, where cognitive benefits given by these medicines are not dose-dependent and have dependence on the baseline performance. Producing bigger benefits in individuals that initially had a worst performance. In this way the use of PCEs, assuming a context of open-access, could contribute to social equity and distributive justice.

Keywords

Cognitive Enhancement, Inverted U Phenomenon, Justice Principle, Neuroethics

Introduction

We are currently in a boom in the use of pharmacological cognitive enhancers (PCEs) such as modafinil, methylphenidate and acetylcholinesterase inhibitors. This boom has occurred mainly in academic and labor contexts, although the interest of the general public has in turn increased significantly. It has been pointed out by several authors the possibility that this trend continues in the future (Teter et al. 2005; Smith and Farah 2011). It should be noted that this trend remains despite the contrasting evidence on the benefits of these types of drugs, it can be said that in general the expectations of users of these types of drugs are far greater than their real-life cognitive benefits (Advokat 2010). The important prevalence of the use of PCEs has produced numerous bioethical objections even assuming that cognitive benefits may actually occur, such as increased concentration or improved working memory. The use of PCEs is clearly questionable when there is no concrete idea about the security of their use in the first term and secondly, when the vast majority of users do not know the adverse effects analogous to
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the use of these types of drugs. There is an important absence of longitudinal studies that evaluate this particular topic. Before this, it is paramount to exercise the precautionary principle (Lewens 2010; Mohamed 2014).

In addition to the doubts about beneficence and non-maleficence that PCE stands for as intervention, the principle of justice is one of the most prominent. In any intervention that involves cognitive enhancement (CE) or human enhancement (HE), there is always a concern that such intervention may contribute to promote social inequality. Since economically dominant classes could abuse the availability of PCEs, in the first place by acquiring them in excess and secondly, by limiting the access of economically lower classes through their economic preponderance, contributing in a bipartite way to maintain the social gap (Farah 2010).

Initially it should be noted that although on a smaller scale, humanity has already had strategies or technology that could contribute to CE. We can name the diet, education, use of mnemonics, or even the use of the internet, among some that have prevailed for centuries in humanity. In general, the use of these forms of cognitive behavioral enhancement (CBE) have not been subject to greater ethical scrutiny, since they were for a long time considered to lack effects large enough to contribute to the existing social gap, and it is only recently that they enter to the neuroethical debate. It can be said that, in many cases, the benefits of CBE outweigh the benefits of PCE. Although by their very modulable and reproducible nature, it is assumed that in the future, with more effective and safer PCEs, they can in fact contribute to promote social inequality (Reiner 2013). The debate on the use of PCEs has produced diverse viewpoints that have enriched the debate. It is difficult to dismiss the biopolitical and philosophical implications that this supposes. Reasons why it is necessary to examine them before continuing towards what the "phenomenon of the inverted U" contributes to the debate.

Bioethical Postures Toward the Use of PCE in a Biopolitical Context

Biopolitical positions around the use of PCE should be considered, in which at least three preponderant currents of thought can be identified: transhumanism, bioconservatism and thinkers who are ascribed in the "view of reasonableness." This spectrum of philosophical thinking embraces the free and indiscriminate use of PCEs, passing through the intermediate point that is to make of these an object of conscious study without scientific or social prejudices, to the point of view dominated by the "precautionary principle" that sees the use of PCEs with disapproval.

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Bioconservatism

This order of thought bases some of its arguments in human dignity and the loss of humanity through the abuse of current technology. The precautionary principle assumes that precautionary measures should be taken before the introduction of technologies that do not have scientific basis to support or oppose their use. This is an argument that is generally welcomed by segments of less radical transhumanism, although there are other arguments in this position. According to McKibben (2004), the modern world has distanced itself from nature, and producing CE beyond what is established as "normal" is the last and most important symptom of this distancing. Another perspective is given by Leon Kass (2003), who served as presidential advisor on bioethics during George Bush's administration. His argument revolves around the fact that the CE presupposes an affront to human dignity. Previously Leon Kass (1998) wielded a different argument against CE, in particular speaking of the genetic modification although extrapolable to CE, in an article entitled "The wisdom of repugnance." He argues that there is something disturbing about CE and this is repugnance, therefore paying attention to what produces repugnance is a way of arriving at morally acceptable conclusions, because disgust is the first evidence of foulness and violation.

There are numerous objections to disgust as a source of wisdom, even pointing out that this principle has been the basis of prejudices throughout a large part of human history. Although it cannot be denied that in the view of evolutionary psychology, disgust evolved as an adaptation to pollution, preventing various organisms from consuming contaminated food and subsequently fading, perhaps the most crucial point is that while there is "wisdom" in disgust, it is difficult to sustain in it as a moral compass (Nussbaum 2006).

Transhumanism

The transhumanist stance sees the free use of PCE with enthusiasm. In fact it goes further, extending the argument to the adoption of more radical and invasive technologies like implants or permanent devices. The aspiration for a program that promotes CE has been a prominent concern of the transhumanist side since its inception. There are several viewpoints of transhumanism around the use of PCE, but we will stick to the "libertarian" point of view that states that the autonomy of the patient is paramount, because the benefits or damages concern him mainly. It should, from an inclusive perspective in the use of CE, integrate the rights of the individual as well as the responsibility of society as a whole (Schneider 2009).

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According to Savulescu (2006), justice can be achieved by bringing as many people as possible to the level of minimum IQ needed to have an acceptable level of possibilities of achieving a decent live. If the method to achieve such equality is the PCE, then justice and equality require the use of CE. The way to level the clearly biased balance towards the rich would be the use of PCE.

Point of View of Reasonableness

Between the previous positions we find the point of view of reasonableness, to which some scientists ascribe. This perspective has a more recent origin and it is noteworthy that it can be assumed as a light transhumanism rather than as a literally intermediate point between transhumanism and bioconservatism (Outram 2012). Greely is one of the main exponents of this position, recognizing some of the concerns inherent in the use of PCE such as: security, real benefit of its use and the limited information available to the general public. As solutions to these concerns, the application of an evidence-based approach prior to the use of these drugs, and the enactment of policies that seek to favor this research in order to make decisions based on standardized studies and not, based on the information currently available, which tends to have discordant methodological designs and to suffer from small samples with little uniformity. It is also important to include research with healthy individuals as opposed to individuals with neuropsychiatric pathologies such as attention deficit hyperactivity disorder.

This view calls on health professionals, bioethics and philosophy in general to participate in the design of these policies, in order to integrate a legislative apparatus that favors scientific advancement instead of hindering it. This point of view exposes the lack of evidence to make an informed opinion regarding the CE and under this precept, seeks the adoption of a new paradigm for research (Greely et al. 2008).

The Inverted U Phenomenon

After examining some of the positions relevant to the use of MCF, it is necessary to explain the relevance of the inverted U phenomenon and what it can add to the debate about its use.

The inverted U phenomenon is a nonlinear relationship that has been frequently reported when studying positive or negative effects of pharmacological and nonpharmacological treatments on cognitive functions and memory. This relationship was initially between cognitive function and other neuromodulatory influences such as arousal, dopamine, acetylcholine and noradrenaline levels, particularly in the context of

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stress. Among the results it was found that the beneficial effects for a given cognitive domain, for example memory, tend to increase to a maximum point and subsequently this effect decreases. Graphically this is represented as an inverted U letter, having limited benefits that increase as it approaches to the optimum dose, and then decreasing until disappearing as this dose increases. It has been observed that this phenomenon is neither dose-dependent nor via-dependent (Baldi and Bucherelli 2005). In addition to the observations made in relation to the dose, the relation with the baseline performance has been highlighted. That is, the individuals who at the beginning presented a worse performance in a certain activity, presented a greater benefit than those with a better baseline performance. In this way it can be summarized that PCEs work best at moderate doses and with individuals with low baseline performance (Mehta et al. 2004; Husain and Mehta 2011; Kelley et al. 2012).

Although the mechanisms that explain this phenomenon are still not well understood, it has been speculated that there may be a relationship with acetylcholinesterase inhibitors among other enzymatic mechanisms. On the other hand, at least speaking of memory, it has theorized the role that arousal would have as a causal agent in this phenomenon. It has been observed in several experiments with PCEs and more recently, was hypothesized as one of the mechanisms of action that could produce cognitive benefits when using modafinil (Battleday and Brem 2015).

Implications of the Inverted U Phenomenon

on the Principle of Justice

Since the emergence of the first technological advances with HE potential, the bioethical principle of justice has been one of the most debated, assuming that they could contribute to promoting the socio-economic gap between countries, besides contributing to social inequality by promoting "cheating" and, among other questions in the order of authenticity, ontologically promoting the questioning: How authentic is an achievement when using PCE? It is also argued about the violation of equal opportunities between individuals who decide not to use PCE versus those who do. And policies on their use would have to take into account the principle of autonomy under consideration, at least economically limiting access to PCE through economic restrictions as a mean of reducing inequality (BMA 2007; Cakic 2009).

Some authors like Savulescu (2006) have argued the inverse idea. Since the use of technology and advances such as education, caffeine and access to computers has turned the balance in favor of economically dominant classes, a way of solving this social

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inequality would be the use of PCEs. Calculations have been made about the "suboptimal intelligence cost", with some estimates suggesting that an increase of 3 IQ points could reduce poverty rates by as much as 25% (Schwartz 1994).

By contrasting both positions we can say that for some time there had been technological and cultural advances that promote social inequality. For example, access to higher education, without producing too much of a bioethical debate. The way to confront this progress was to make policies that promote access to education in a mandatory way. Although there are other factors that contribute to the absence of distributive justice and to a greater or lesser extent, they promote social inequality. It is difficult to dismiss the role that education, diet (in the context of neurodevelopment) and access to the internet have played and currently play.

Thus the inverted U phenomenon dictates that benefits would be greater for individuals with low baseline performance, and under this assumption it could be argued that it could contribute to creating a level playing field when assuming free access to these types of drugs. Populations that have less access to some CE means such as those mentioned above, could benefit from the distribution of hypothetical PCEs with few adverse effects and a reproducible and verifiable benefit. Notably, it would be considerably questionable to promote, for example, free access to modafinil with the argument of distributive justice insofar as it is not a harmless intervention and its beneficence is questionable.

Some authors go so far as to assert that it is a moral obligation on grounds of equality, to allow free access to these drugs to populations with low and normal intelligence. By examining the issue from a utilitarian perspective, it could contribute to improving the quality of life of a significant portion of the population by enhancing their employment and academic potential (Dunlop and Savulescu 2014). Another view is that the use of public funds should only be used for curative rather than improvement purposes, as well as emphasizing the importance that the use of CE should not be used to promote asymmetrical relationships between individuals and groups, namely, socioeconomic levels (Shook and Giordano 2014).

In the opinion of the author, and particularly speaking of the bioethical principle of justice, consideration should be given to both ideas and to the discussion of legislation in the use and access to CE, particularly of existing technologies such as PCE or use of transcranial magnetic stimulation. The guiding principle of the usefulness of this "speculative ethics" lies in foreseeing implications that may have certain scientific advances with CE potential, and in this way address problems such as contributing to the socioeconomical gap or promoting inequality in a prophylactic manner, as opposed

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to recoiling when the enhancement is producing a certain undesirable effect for society (Schlag 2013). Free access to PCEs should be one of the drivers to consider when beginning to implement public policies that regulate the use of PCE. Without demeaning the importance that beneficence and non-maleficence have, considerations that we can affirm, are much more current because although the benefit is still questionable, adverse effects analogous to PCE use are currently happening.

Conclusions

One of the most important concerns about the use of CE in general and PCE in particular is based on the implications this has for the principle of justice. Will its use contribute to social inequality? Will it increase inequality in the academic world? Assuming that the benefits of PCE are unlimited or dose dependent, it can be argued that in effect, economically dominant classes could have greater access to these drugs and thus, promote social, academic and labor inequality. However, the fact that clinical trials have found that the benefits of PCE are compatible with the inverted U phenomenon clarifies two things to us. One, there is no dose-dependent relationship. And two, the benefit is proportional to baseline performance, greater for the worse and smaller for the best, producing a kind of balance. Obviously, it may be too reductionistic, since like any other drug, its use depends on a restriction of distribution access and primarily economic cost. However, if there is no free access to these drugs the benefit would be more theoretical than practical. Thus, speaking in terms of policies regarding the use of MCF, it is important that the debate analyzes the potential that PCE could be used to reduce the socioeconomic gap rather than expanding it, being essential to consider free access to them as one of the most important topics. It should be noted that this type of argument can be characterized as part of "speculative ethics" since PCE is assumed with reproducible, constant benefits that can "affect performance in daily life", qualities that the present PCE debatably does not present. The importance relies therefore in the potential of preventive policies rather than "interventional" when there is an undesirable effect such as the promotion of social inequality.

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