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ARTICLE

Toward Informed User Decisions About Pharmacological Cognitive Enhancement

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Abstract

Pharmacological cognitive enhancement (PCE) refers to the use of pharmaceuticals to improve cognitive function when that use is not intended to prevent or treat disease. Those who favour a liberal approach to PCE trust users to make informed decisions about whether enhancing is in their best interest. The author argues that making informed decisions about PCE requires a nuanced risk-benefit analysis that is not accessible to many users. Presently, the PCE use of prescription medications such as methylphenidate and modafinil is widespread but most commonly happens without medical supervision. Direct and indirect barriers generate a situation where the risks and benefits of PCE are inequitably distributed; as a result, PCE is sometimes not in the user's best interest. This is likely to also be the case for future pharmaceuticals. As a result, even if PCE pharmaceuticals were equitably distributed, its associated risks and benefits would not be. The article concludes with a discussion of the prospects of the clinical consultation on one hand, and e-health solutions on the other, in ameliorating the situation, arguing for cautious optimism.

Keywords: human enhancement; pharmacological cognitive enhancement; cognitive function; risk-benefit analysis; methylphenidate; modafinil; e-health; decisionmaking

Introduction

Cognitive enhancement refers to measures taken to improve cognitive function when the purpose of the intervention is not the prevention or treatment of a disorder. Cognitive function is an umbrella concept that encompasses a range of mental functions, including information processing, learning, memory, and executive functions such as inhibitory control, attentional guidance, and forward-looking planning processes. In this article, I discuss informed decisionmaking, particularly risk-benefit assessment, about current and future pharmacological cognitive enhancement (PCE).

PCE refers to the use of pharmaceuticals in an effort to improve cognitive function. Currently, medications such as methylphenidate and modafinil, typically used as prescription drugs for attention-deficit hyperactivity disorder (ADHD) and for sleep disorders, are sometimes used by people without those disorders in an effort to improve their attentional and executive functioning capacities. Methylphenidate inhibits dopamine reuptake and increases the availability of dopamine and norepinephrine in the brain, a mechanism thought to explain its effect on patients with ADHD. Modafinil is used in particular for its wakefulness-promoting effects; however, the exact mechanism underlying these effects remains unknown.

Not all cognitive enhancers are pharmaceuticals. For example, improved nutrition, caffeine, sugar, physical exercise, sleep, meditation, and training can all improve cognitive function.[1] However, this does not entail that they would be ethically on a par.

Ethical considerations surrounding PCE include concerns about the safety and efficacy of PCE, as well as concerns about the autonomy and authenticity of users. The general idea among proponents of PCE is that, much like with cosmetic surgery, risking adverse effects is acceptable, so long as there is a reasonable expectation that this is, on balance, in the user's best interest; whether this is so is highly personal. For proponents of PCE, patients' autonomy should be respected by trusting their own

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assessment of whether they could benefit from PCE. For example, Bostrom and Sandberg suggest that the user should be allowed "to decide whether the benefits outweigh the potential risks, based on advice from medical professionals and her own estimates of how the intervention might affect her personal goals and her way of life."[2] Likewise, Rakić argues that the main arguments leveled against PCE "are not prima facie sufficient to prohibit interested individuals from using them."[3] In other words, a liberal approach to PCE is justified by appeal to patient autonomy. It suggests that if medical advice is available, the user is well placed to assess the risks and benefits of PCE and decide accordingly; and to limit her choices would therefore intrude on her autonomy. Critics of PCE, by contrast, have raised autonomy-based considerations such as whether the decision to enhance can be autonomous and whether the use of PCE could undermine autonomy and authenticity.

PCE also raises questions regarding justice and fairness. These include the concern that those who engage in PCE would stand at an unfair advantage over those who do not, and the concern that opportunities for obtaining the pharmaceuticals would be inequitably distributed, if considerations such as prohibitive pricing make it available only to a (wealthy) minority of people.[4]

While the fairness of PCE has been much discussed in terms of whether the pharmaceuticals could be made universally available, whether they pose harm for non-users (via "doping" or competitive advantage), and whether they constitute a viable target for the use of scarce healthcare resources, the distribution of *risks and benefits* of PCE among actual and prospective users has been little discussed. In this essay, I discuss the complexities of risk-benefit assessments in deciding to enhance and argue that the risks and benefits of PCE are currently inequitably distributed among users. I further argue that this inequity stems in part from both direct and indirect barriers to informed user decisionmaking about whether to engage in PCE.

In other words, even when prospective users are not directly barred from making their own decisions about PCE much like Bostrom and Sandberg suggest, we ought not to take for granted that all prospective users would be well placed to make those decisions. Indirect barriers to informed decisionmaking result in decisions that are not in the user's best interest. In effect, the argument from patient autonomy can only be successful if prospective users have access to information, but this access is currently inequitably distributed. A liberal and equitable approach to PCE cannot simply assume that agents are well placed to assess whether they could benefit, but must actively enable agents to make that assessment.

A couple of caveats are in order about what this essay does not do. First, this essay limits its discussion to adults: the use of PCE in children is subject to a further controversy that falls outside the scope of this article. Second, I take no stance concerning the legality of PCE, although it is worth noting that legislation can work to build or dispel barriers to accurate information. Nor do I claim that equitable access to informed user decisions would be sufficient for PCE to be ethically acceptable. Multiple concerns, including safety, efficacy, authenticity, and whether enhancements can be collectively self-defeating, must be taken into account in the overall assessment of the ethics of PCE.[5,6] Rather, the aim of the article is to highlight informed user decisionmaking as an important, neglected aspect in assessing whether the individual and collective benefits of PCE outweigh its harms, and an aspect that may, if unaddressed, be the demise of the liberal approach to PCE.

The Argument for PCE from Patient Autonomy

Pro-enhancement arguments often proceed from the standpoint of liberalism, within which patient autonomy plays a key role in medical decisionmaking. While there are multiple philosophical accounts of autonomy, within this framework, autonomy in the context of medical decisionmaking is generally taken as comprising competence, authenticity, and liberty. Competence entails that the agent is sufficiently informed and possesses adequate reasoning capabilities in order to be able to assess what their options are, reliably evaluate them, and identify which option best matches their wishes and needs. Note that in the medical context, particularly, local competence suffices: For example, a person suffering from social anxiety may have inaccurate beliefs about how others regard her, but be perfectly capable of deciding whether to undergo major surgery. Authenticity entails, at a minimum, that the person decides

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on the basis of their own values and preferences. Liberty, here, entails that the agent is not being coerced, manipulated, or pressured to choose in a specific way. In the context of medical decisionmaking, it is assumed that adults, if armed with information, are sufficiently autonomous to make decisions. Paternalism is rejected on grounds that people vary in what values and preferences matter most to them, and are therefore uniquely well placed to make these choices.

Against this backdrop of highlighting procedural autonomy, pro-enhancement arguments defend the claim that adults should be free to make their own decisions about whether or not to enhance. For example, take Greely et al.:

> From assembly line workers to surgeons, many different kinds of worker may benefit from enhancement and want access to it, yet they may also need protection from pressure to enhance.[7]

Here, Greely et al. emphasize the desiderata of equitable access to the pharmaceutical; the core threat to autonomy is coercion either to enhance or not to enhance. The same themes continue to be highlighted throughout the literature, such as in Metzinger and Hildt:

> In open, democratic societies [policies concerning cognitive enhancement] […] should be guided by a general principle of liberalism: In principle, the individual citizen's freedom and autonomy in dealing with their own brain and in choosing their own desired states of mind (including all of their phenomenal and cognitive properties) should be maximized.[8]

These authors, and others, have expressed their confidence that adults should freely choose whether they wish to engage in PCE. The theme of autonomy concerning PCE has been explored with an eye on whether legalizing PCE would limit autonomy by decreasing liberty, if there is a risk that peer pressure or other forms of coercion to enhance would emerge; and some have worried that the pharmaceutical effects of PCE would decrease autonomy by decreasing authenticity[9]; or else suggested these effects may instead increase autonomy by increasing competence.[10]

The role of competence in decisions to enhance has been a sidenote, however, plausibly because it is assumed that decisions to use PCE happen in similar epistemic conditions to other medical decision-making. Obviously, competent decisionmaking requires accurate information, and those pleading for liberal legislation around PCE also include calls to "thoroughly and *objectively* inform the public on the effects, side effects, chances, and risks of cognition-enhancing substances"[11] or to "increase public understanding of cognitive enhancement."[12] Informing the people is treated as both a necessity and a sidenote.

As I will next demonstrate, however, engaging in PCE under limited or unreliable information is currently closer to a norm than an exception. Making accurate assessments of the risks and benefits of PCE requires nuanced and personalized information that is not straightforward to procure. Inequitable access to accurate information makes users poorly placed to make competent decisions about PCE. This need for nuanced and personalized information is unlikely to be a contingency specific to the current medical and social landscape, but rather is a factor that generalizes to future PCE. As a result, deregulation alone does not suffice for enabling the sort of procedural patient autonomy that liberals about enhancement endorse.

Assessing Safety and Efficacy in Users Requires Nuanced and Personalized Information

In assessing the risks and benefits of PCE for the individuals who engage in it, the safety and efficacy of the pharmaceuticals used are a major concern. Currently, pharmaceuticals such as methylphenidate, piracetam, mixed amphetamine salts, and modafinil are used by adults to improve their cognitive performance. Due to the varied means of procurement of pharmaceuticals for PCE, prevalence of use is hard to measure; previous studies within specific sample populations have indicated prevalence of use as high as 25% on some college campuses.[13]

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In a recent nationally representative sample (N = 102,000), by contrast, 1.9% of US adults use stimulant medications for purposes other than the management of a disorder without use disorders. Out of these users, 56.3% reported using the medication to help them stay alert or concentrate; the second largest purpose of use was to help them study (21.9%).[14] This suggests that while not as common as studies of specific populations have indicated, the PCE use of stimulant medication is a widespread phenomenon. The data gleaned from this study also indicate that the PCE use of prescription stimulants may not be the tool of high achievers that some suggest. Being positively correlated with a household income of less than $20,000 and with prior and current substance use disorders, it may, instead, sometimes indicate an attempt to improve a life of hardship. While there likely are pronounced geographic, and cultural differences in the prevalence of use between the United States and other populations, studies of prevalence of PCE on college campuses and in other specific populations outside the United States establish this is not limited to the United States alone.[15]

Drug regulation organs within the US Food and Drug Administration (FDA) and European Medical Agencies (EMA) have not approved PCE as an indication for pharmaceuticals such as methylphenidate or modafinil. PCE is nevertheless promoted by influential personalities: For example, in a recent self-help book, entrepreneur and media personality Dave Asprey claims that modafinil "gives you superhuman mental processing powers with few to no downsides."[16] While these claims are false, they are received by a significant fan following and contribute to PCE as a growing phenomenon found in various walks of life, rather than merely a form of "college doping."

From a public health perspective, one pertinent concern is whether those who engage in PCE are at risk of harming their health. Medications such as methylphenidate and modafinil are often touted as safe; however, all medications have side effects, and the safety of each medical intervention should therefore be established by assessing the ratio of risks to benefits, which is subject to some interpersonal variance based on counterindications and what the individual can reasonably hope to gain from the intervention.

While early studies indicated some promise for cognitive enhancers, subsequent replications and meta-analyses have showed the cognitive enhancing effects of current pharmaceuticals to be modest at best. Both non-users and users of PCE tend to overestimate their effects, which is one possible source of both exaggerated claims, like Asprey's, and exaggerated concerns surrounding autonomy and authenticity of these pharmaceuticals. Anecdotal experiences of "superhuman mental processing powers" may thus result from the improvements in mood, motivation, and confidence that these disproportionate expectations cause.[17,18] Furthermore, there is some debate about the overall efficacy of major PCEs such as methylphenidate and modafinil, including in clinical use in the treatment of disorders such as ADHD; their effect in the treatment of ADHD is modest,[19] which urges further caution about making strong claims about the benefits of these pharmaceuticals. The hope is that future pharmacology may yet produce interventions that deliver more robust effects than current pharmaceuticals do.

Alterations in cognitive function resulting from current medications impact a broad swath of neural functioning. Due to the interconnected nature of neural mechanisms, it is likely that this will also be the case for future pharmaceuticals. The approach found in some earlier literature[20] that operates on an idealized notion of a perfectly safe future cognitive enhancer should therefore be considered useful as a thought experiment only. Actual PCE interventions, current and future, are not likely to be limited to cognitive functioning in their effects.

Despite being generally well tolerated, PCE substances each have significant side effects that severely decrease their applicability for some individuals. For example, modafinil and methylphenidate each may cause weight loss,[21] which is a counterindication when the prospective user is underweight or suffers from an eating disorder. In a review of studies concerning PCE medication efficacy in healthy individuals, observed adverse effects on modafinil included dizziness, headache, nausea, dry mouth, abdominal pain, sleep disturbances including insomnia, palpitations, tachycardia, nervousness, and restlessness.[22] These adverse effects, while not dramatic, have cumulative effects that may undermine the goals of users in engaging in PCE. A college student, stressed and tired from working a part-time job while getting her degree, may engage in PCE in the hopes that her improved cognitive performance would make assignments quicker to complete and thus make her life less stressful. But if insomnia and nervousness result from the medication, her life may turn out to feel more, not less, exhausting.

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The risks for insomnia, nervousness, and restlessness are particularly important to take into consideration for prospective users with mental disorders, such as major depressive disorder (MDD), or with a history of the same. This is because lack of sleep and anxiety are risk factors for many mental disorders.[23] In these cases, both the prospective risks and the prospective benefits of PCE may be pronounced: On the one hand, the user risks triggering a new episode of their relapsed disorder (or intensifying a current one). On the other, disorders such as MDD adversely impact the executive functions,[24] and persons with such disorders may therefore have a more to gain from PCE. Assessing risks and benefits in users, therefore, requires nuanced reflection that considers the promises and risks of PCE *for that user*.

Informed and reflective decisionmaking about PCE stands to alleviate these concerns greatly. Informed users may assess to what extent the possible adverse effects of pharmaceuticals would be harmful to them, and to reflect on the possible results of PCE and whether their expectations are realistic. Based on such an individualized assessment, risks and benefits could be more accurately gauged. Such a multifactorial assessment is not an easy task, however, and it would be made greatly more feasible if accessible, verified information and guidance were available, such as via consultation with a physician.

However, such a consultation is not within easy reach of all prospective users. In the next section, I will argue that the current heterogeneity of PCE procurement generates barriers to informed decisionmaking about PCE. As a result, some users risk considerably larger harm than others.

Barriers to Informed Decisionmaking Raise Problems for the Autonomy View

One source of the variable safety of PCE is the considerable variance in how users obtain these pharmaceuticals. While there are geographic and demographic differences in obtainment, stimulant medications are most often procured from friends or relatives, either for free, by buying, or by stealing.[25] Pharmaceuticals for PCE may also be obtained from online sources[26] or from the pharmacy with a physician's prescription. Legality greatly influences user strategies in obtainment.

When pharmaceuticals are obtained from friends and family, while users may conduct online or library research on the medications, they will also be particularly subject to culturally transmitted impressions of the safety and efficacy of the medication. Uncertainties about the pharmaceutical are addressed, in part, through learning about peer experiences and opinions. These experiences and opinions may amount to the transmission of disproportionate optimism, resulting in the user inaccurately assessing the risks and benefits of PCE and choosing to enhance based on inaccurate information. The reverse may also occur, as adverse peer experiences may cause disproportionate pessimism, depriving someone who would benefit from the possible positive effects of PCE.

Uncertainties surrounding risks and benefits do not evaporate by trying out the pharmaceutical. As mentioned above, improved productivity after consuming a pharmaceutical may simply result from increased optimism and motivation. Furthermore, users may also, even after repeated use, be uncertain about whether the pharmaceutical has been effective. Here, a lengthy citation from a study by Petersen et al. is pertinent. "Harrison," an MA student and one of the interviewees, describes his struggles in assessing the efficacy of stimulants as cognitive enhancers:

> There are times where I wonder if stimulants do anything positive at all. Certainly superficially it would seem like they are, you have increased energy, this sort of intense connection, focus on the material, but at the higher doses, it starts to become slightly frantic … and if you're writing something very quickly, you have this sensation that you're being very productive and that you are enhanced as a worker, but just because you're writing quickly doesn't necessarily mean that you are writing more or of higher quality. […] It's no question that I would, if possible like to stop taking stimulants. I would like to stop, but really the deciding factor is, do they make me better at working? And if the answer is yes, then it's something I'm willing to risk and willing to take on the burden of … in order to do more things. But if they don't then it's really stupid to be taking them.[27]

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Harrison's thoughts about his PCE highlight two matters. First, conducting an accurate risk-benefit analysis is difficult for users, even after repeated use. Second, the risk-benefit analysis may be highly personalized. Harrison comes across as saying that if he can "do more things," then he is willing to endure a fair bit of adverse effects. Some other persons would doubtless rank productivity lower in importance than, say, adverse impacts on sleep quality. But Harrison also has a hard time judging whether the stimulants in fact do improve his productivity. He is acutely aware that his current decisionmaking about PCE is not as well-informed as he would like it to be.

Users like Harrison can rely on a variety of resources for information: they can consult online information, friends, relatives, medical textbooks, and physicians. However, information is not universally or equitably accessible. Not all users have the requisite educational background (regardless of whether that is the result of formal education or self-education) to be able to discriminate which sources of information are trustworthy; for this reason, self-directed online information searches will only support informed decisionmaking for those users with suitable background knowledge. While some friends and relatives may have accurate information about pharmaceuticals, peer networks are also a source of culturally transmitted myths about PCE. Petersen et al. call this set of beliefs a "folk pharmacology" and note that the folk pharmacology influences not just deliberation about whether or not to engage in PCE, but also interpretations of the positive and adverse effects of PCE.[28]

Returning to the criteria for autonomous patient decisionmaking—those of competence, authenticity, and liberty—people like Harrison clearly are not being directly coerced to PCE. However, even well-educated adults may lack local competence for making decisions about PCE. It can be hard for them to assess whether PCE in fact helps or hinders their own values and preferences.

As the case of Harrison illustrates, there is good reason to believe that it is in fact rare for an agent to be well placed to assess whether PCE stands to benefit them. This is a serious problem for the liberal approach given its assumption that the user knows best.

Do Real or Ideal Clinical Practices Enable Informed Decisions?

To the above, the proponent of the liberal view will likely respond that medical advice can resolve our concerns about decisionmaking competence. Consulting a physician may be the most reliable aid for informed decisionmaking. Of course, not all physician recommendations are sound. However, physicians are extraordinarily well placed to counsel on the topic, and therefore consulting with a physician with the requisite background information can be considered a benchmark for informed decisionmaking, placing decisions about PCE on a par with other difficult medical choices.

Users are, however, not equally well placed to access such a consultation. First, not all users have access to the sort of robust healthcare where consultation on PCE would be available. Second, even when that is available, due to legal parameters surrounding PCE, not all users would feel comfortable discussing the prospective or ongoing use of PCE with a physician, particularly if the pharmaceuticals are not obtained in a manner sanctioned by the medical establishment.

It may then appear that obtaining the pharmaceuticals via a prescription by a physician would better enable users to access accurate information about those pharmaceuticals, within the same clinical relationship where the prescription is written. However, obtainment from a physician, while rare in comparison to obtainment from friends and family, is likewise diverse in its methods. It bears repeating that the consumption of stimulants for the treatment of a disorder is not PCE. Users of PCE may obtain a prescription by finding a physician willing to prescribe the pharmaceutical for off-label use; by finding a physician willing to falsely diagnose a disorder in order to prescribe the pharmaceutical, seemingly for an approved indication, in full knowledge that the intended use is PCE; or by leading their physician to believe that they do in fact have an approved indication for the medication, such as, by convincing a physician that they have ADHD. Setting aside ethical considerations surrounding wilful misdiagnosis as the focus here is on user decisions, only in the first two patient-physician interactions is the physician well placed to counsel the patient in making informed decisions about PCE. When the physician has false information about the health of the patient, their advice concerning the risk-benefit ratio will be colored

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by that false information. Correspondingly, the EMA's conclusion is that for modafinil, only in the case of narcolepsy do the benefits outweigh the risks.[29] Even if the EMA's assessment were to be taken as a generalization, and the risk-benefit ratio of modafinil was adequate for *some* PCE users, this highlights that physicians' impressions about the health of their patient will strongly impact how they counsel patients wishing to gain from PCE. The procurement of a pharmaceutical by falsely portraying a disorder thus prevents the patient from discussing the actual projected risks and benefits with that physician.

In sum, users use a variety of methods to procure pharmaceuticals for PCE. It continues to be uncommon for a physician to prescribe the pharmaceutical in full knowledge that it will be used for PCE: more often, the methods of procurement reflect a variety of ways to avoid, rather than make use of, consulting medical professionals concerning PCE. The variable means of procurement are a result of widespread prohibitive guidelines and laws surrounding PCE, as well as a result of variable access to healthcare services.

The status quo of PCE distribution is therefore doubly inequitable. First, some people, but not all people, have access to pharmaceuticals for PCE. Access to pharmaceuticals seems to track access either to a peer group where these are circulated, or to a medical practitioner who is either willing to prescribe the pharmaceutical in full knowledge of that PCE is its intended use, or else can be misled.

But there is a further structure of inequitable distribution relating to PCE. Namely, access to informed decisionmaking about PCE is also inequitably distributed. Out of those who engage in PCE, only some are able to make their assessments about the risks and benefits of PCE based on accurate information: others will either make them under uncertainty, like Harrison, or under false expectations, like readers of Asprey.

Perhaps for future pharmaceuticals, their enhancing effects would be pronounced enough that it would be easier to assess whether one benefits from it. However, as discussed above, cognitive effects without side effects are a theoretical possibility only. In practice, future pharmaceuticals, too, will be riskier for some than they are for others. The need for nuanced risk-benefit analyses and informed decisionmaking therefore persists even as pharmacology advances.

The barriers to informed decisionmaking, however, are a contingency that could be ameliorated. If, for example, physician consultations surrounding PCE would be made universally accessible as well as socially and legally acceptable, this can be expected to have a formidable impact on the barriers surrounding informed decisionmaking about PCE. This is a theme for the next section.

The Clinical Solution May Not Suffice

In this article, my aim is not to defend or oppose the universal availability of PCE; that topic has been discussed elsewhere in the literature.[30] If, however, PCE should become universally available, should everyone be able to access it after consulting with their doctor? In light of the above discussion of the role of medical professionals in informed decisionmaking, this would seem like it would help guide users to accurate information about PCE. Clinical consultation can be treated as an adequate baseline for informed decisionmaking: After a clinical consultation, or its equivalent in terms of personalized information, we can have reasonable confidence that the user is able to make an informed decision about PCE.

However, even if ideal, a scheme like this runs into the problem of scarcity. Proponents of PCE sometimes argue that current pharmaceuticals are not, or need not be, prohibitively costly and that there is no principled obstacle to wider-spread production; likewise, for future PCE, if the cost of the future pharmaceutical is reasonable, there would be no principled reason not to produce enough to provide adequate coverage on a par with other publicly accessible health services in welfare states. If the pharmaceutical can be produced at a modest cost, it need not be the privilege of the few. However, medical professionals are not so easily mass-produced. Even if pharmaceuticals were to cost pennies, consultations with doctors would not. In other words, in a world where PCE pharmaceuticals would be equitably distributed, access to informed decisionmaking about PCE—and, as a result, the risks and benefits of PCE—would continue to be inequitably distributed.

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Could society ensure equitable access to physician consultation regarding PCE, such as by training more doctors? This solution, while seemingly attractive, runs into the problems of scarcity and prioritization. Given that there are copious global health problems, a pressing point about prioritization of healthcare resources remains: One can with good reason ask whether clinicians should put their time in consulting people on PCE, when they could conceivably spend that time in other pursuits, such as the treatment of disease. While many optimistic futures and drastic policy changes can be envisioned, reasoning in medical ethics that hinges on first resolving the problem of the scarcity of expert labour may not be the most fruitful approach.

Additionally, access to clinical consultation, even on matters of treating disease, is inequitably distributed. In some countries, the lack of a substantial public healthcare system prevents some from accessing adequate health services; but even in countries with such a system, some socioeconomic disparity in access to clinical consultation persists. One source for these disparities is that public healthcare systems are typically complex to navigate, and citizens are not equally well informed about what services they are entitled to and how these services can be accessed. As it stands, equitable access to clinicians is a work in progress, including in countries with robust public health programs. As a result, even if universal clinical consultation on PCE were offered, which users would in fact benefit from this resource would likely track other measures of socioeconomic disadvantage.

Recalling that the role of the consultation is to provide personalized, accurate information, in other words, even in an abundance of any given substance used for PCE, there may not be an abundance of accurate information. If PCE were cheap and easily available, but accurate and nuanced information about it were as hard to come by as it is now, then there would likely be many more finding themselves in Harrison's shoes: using PCE but wondering about whether it is in fact helping, or whether they are instead doing something unwise. Yet others would have come to conclusions about enhancing or not enhancing that would be founded on misinformation. This comes at a cost: some who gain little or no benefit may be unduly bearing the burden of risks and adverse effects, whereas some who stand to gain much may decide not to enhance based on false or exaggerated beliefs about the risks of enhancing. While the decision to enhance should always be based on the needs and wants of the subject, improved availability of accurate information could help subjects better assess whether PCE responds to those needs.

A further concern in providing adequate consultation for prospective users of PCE is the complex role of past and current psychiatric symptoms. There are multiple reasons to treat this as a central, rather than peripheral, concern for the ethics of PCE. First, many of the adverse side effects of stimulants currently used for PCE, such as insomnia, anxiety, and loss of appetite,[31] are particularly harmful to people with past or current substance use, eating, or psychiatric disorders, as for many such disorders these effects present a clinical risk.

Second, the prevalence of the use of PCE is documented as higher in people with MDD and with suicidal ideation than in persons without these mental health problems, suggesting that PCE may be used to self-medicate. Many of the adverse effects associated with stimulant medication carry a risk of new or intensified depressive episodes.

Third, these users may stand to gain more from PCE. Many psychiatric illnesses adversely impact the executive functions, whose functioning stimulant medication has a modest positive effect on. For some psychiatric patients, this modest effect may have a large impact for their overall well-being even if it is not intended to cure the disease. For persons with existing psychiatric symptoms, stimulants therefore pose a higher risk, but may also pose larger benefits for some within this group.

Fourth, the demographic data surrounding current stimulant use for PCE suggest that many PCE users may come from vulnerable populations, as the phenomenon is correlated not just with psychiatric history but also with many other measures of health and socioeconomic status. In a recent study of stimulant use prevalence in the United States, the use of stimulants seven times or more in a month was correlated with having less than a high school education, with past and current substance use disorders, with depressive episodes, and with being disabled for work.[32] In other words, the popular imagination of the cognitive enhancer as a hotshot law student may not accurately represent the demographic that health policy surrounding PCE will have the largest impact on.

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From a distributive justice perspective, then, even if equitable access to the pharmaceuticals for PCE could be ensured, the risks and benefits of these pharmaceuticals would not be equitably distributed. This is because the extent to which users would in fact be well placed to make decisions about PCE would not be equitably distributed. Liberals about PCE should respond to this concern by urging practical steps toward equitable access to accurate and personalized consultation to improve access to informed decisionmaking. Yet the scarcity of expert labour makes this desideratum difficult to put into practice.

However, perhaps there is yet hope for the liberal stance: There may be ways to provide accurate and personalized information without the requirement of prohibitive amounts of expert labour. Particularly, the recent increase in electronic health services (e-health, for short) carries both promises and burdens. In the next, final section of this article, I discuss whether e-health could help improve equitable access to accurate information about PCE.

Accessing Personalized Information Via Electronic Health Services

The above discussion, which highlighted clinical consultation as a sufficiently reliable support for informed decisionmaking, has likely struck some readers as quaintly old-fashioned. After all, for many users of health services, clinical consultation is not their first stop in acquiring medical information—the Internet is.

However, while online medical information abounds, some of it is not trustworthy and very little of it is personalized. The role of the clinical consultation, after all, is not simply to convey general facts about PCE, such as can be found in medical textbooks, but to address how they relate to the specific user's general health, whether there are contraindications for use, and how likely that user is to benefit.

While information supplied by general medical information websites is too general to fulfill this role, in principle, interactive health systems may satisfy these demands. Indeed, patients increasingly employ various interactive online information tools, such as symptom checkers, as a means to help assess their health needs. These interactive tools range from simply programmed questionnaires, such as symptom checkers, to complex artificial intelligence algorithms. In the United Kingdom, the National Health Service's (NHS) use of various mobile health tools has been described as empowering the patient: for this narrative, apps, health sensor devices, personal health software, and the like are described as tools that patients may use to shift control of their health increasingly from the doctor to the patient. While this narrative is worth questioning, digital solutions are fairly well suited for the role of personalized information seeking and may take the role of a consulting companion in personalized healthcare, helping patients gain the local competence required for them to make informed decisions about their health.[33]

Depending on the outcome alternatives for the digital consultation, e-health can take on an important triaging role. One example of this has been seen during the COVID-19 pandemic, during which many public health systems utilized advisory symptom checkers that advised patients on whether their symptoms satisfy the grounds for getting tested for the virus according to local public health policy. All of this gives grounds for some cautious optimism about the use of digital solutions for the provision of personalized guidance about PCE.

This optimism, however, is met by three lines of criticism. First, while digital solutions are less resource intensive than clinical consultation, they do use resources, and any use of healthcare resources must be justified against other possible targets for those resources. The development of digital solutions, then, is only justifiable if it can be done at an acceptable cost. Another line of criticism is that digital solutions would not provide accurate enough personalized guidance. For this line of criticism, however, it can be responded that well-designed Artificial Intelligence (AI) diagnostics and counseling already sometimes outperform consultation by human clinicians. While poorly designed AI can yield poor recommendations, such as the well-known problem of recommendations unduly based on race or gender, these are not an inevitable feature of digital solutions, but can instead be avoided by skillful design of the digital solution.[34]

However, there is a third line of criticism that is much harder for digital solutions to shake off. Namely, the sort of information that is pertinent for an accurate risk-benefit consultation about PCE is

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rather more sensitive than the information required for assessing whether the patient is a candidate for a virus test. This raises dire concerns surrounding data privacy and data ownership.

For example, for assessing the possible risks and benefits of current PCE pharmaceuticals, awareness of factors such as prior psychiatric symptoms is important, as it is crucial that the user is aware that some forms of PCE may cause symptoms such as anxiety and that their existing symptoms may be compounded by the use of PCE. On the other hand, some persons with a prior history of psychiatric illness may benefit more than others from PCE, for which reason it would not be an unequivocally good solution to simply advise persons with past or current mental health symptoms not to enhance. As many psychiatric conditions adversely impact the executive functions, on which stimulant has a modest positive effect, for persons with these conditions this modest effect may have a large impact on their overall well-being even if it is not intended to cure or manage the disease. Furthermore, for some persons who have symptoms but have not received a diagnosis or mental health services, they may seek out PCE rather than those services in an effort to manage those symptoms. A system on a par with clinical consultation would notice this and direct such individuals to a mental health professional.

Accurate risk-benefit analyses therefore require detailed information about the prospective user's mental health. Given the particularly sensitive character of such information, stringent regulation of data privacy and data ownership[35] are prerequisites for the consideration of processing sensitive data within an e-health interface. In other words, in addition to ethical considerations concerning patient safety and distributive justice, as discussed above, the longstanding ethical quandaries of information ethics become pertinent when looking into e-health for solutions to the scarcity problem. These information ethical concerns are not specific to PCE, but rather, apply to e-health more generally. However, they ought to be emphasized in this context, particularly given the sensitivity of the data required.

The prevalence of persons with diagnosed or undiagnosed psychiatric symptoms in users of PCE also suggests that any system for accessing personalized information about PCE must be designed to properly respond to vulnerable patient groups. One possibility is for the role of the e-health application to be a triaging one, directing persons with strong counterindications or from potentially vulnerable groups to a consultation with a human clinician. However, such a solution is only as equitable as factual access to such consultation is. Vulnerable patient populations currently face a range of barriers to accessing the full range of health services, resulting in poor public health outcomes.[36] It is likely that e-health triaging and direction to clinical consultation would fail to reach all patient groups equally, and that targeted improvements in access to health services would be a prerequisite for truly equitable access to PCE. It should be highlighted, again, that this is no marginal issue for PCE, since the population-level research on current PCE indicates that persons with past or present psychiatric symptomology are strongly represented in PCE users.

Conclusion

Inequalities related to enhancement have typically been discussed in terms of whether enhancing is an unfair advantage. However, as I have above demonstrated, all is not fair among users of cognitive enhancers. In this essay, I have highlighted that the risks and benefits surrounding PCE are not equitably distributed among users. In my analysis, I have argued that differences in access to informed user decisionmaking are a source of these disparities.

While liberals about PCE believe that the patient knows best whether or not PCE is right for them, as the above discussion highlights, few users are well placed to assess the costs and benefits of PCE. Instead, decisions about whether or not to engage in PCE are often made under uncertainty or false impressions.

While the popular imagination portrays the persons using PCE as hotshot law students and ambitious professionals, demographic data indicate that many who enhance come from vulnerable and disadvantaged groups. If access to informed decisionmaking about PCE is not ensured, there is a danger that users from these groups end up engaging in PCE with adverse rather than beneficial results to their performance and well-being.

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Access to informed user decisionmaking is paramount for an accurate risk-benefit distribution. Presently, for PCE, such access is spotty at best. From a public health perspective, improved access to improved user decisions yields improved health and well-being for current and prospective PCE users. The more accessible PCE pharmaceuticals become, whether through affordable pricing, steps toward deregulation, or a combination of both, the more pressing the issue of informed user decisionmaking becomes.

Finally, I have discussed e-health services as one possible means to help improve access to informed user decisionmaking. E-health services are booming, and it is possible that the e-health scenario for PCE consultation, described above, is closer to a default near future tendency than it is to a reasoned solution. However, the emergence of clinical software solutions, in particular, has taken medical ethicists and regulatory organs somewhat by surprise: for example, in the United States, the booming industry of mobile health applications has been minimally regulated as a result of many regulatory guidelines pertaining to hardware rather than software. Raising these public health concerns should occur before, not after, a practice that is widespread, so as to prevent harms that could have been identified in advance. To do so, ethicists need to keep an eye not just on the philosophical and conceptual aspects of PCE, but also on the contingent, empirical, public health factors that shape the real consequences of the policy at hand.

Policy concerning PCE should endeavor to enable equitable access to informed user decisions about PCE. Even if better, more effective PCE substances are devised, the need for informed decisionmaking persists. If e-health solutions are applied for this purpose, however, medical and information ethics must join forces to meet the challenge of generating an accessible, safe, and ethically sustainable digital solution.

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