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Do Cognitive Enhancers Have the Potential to Change the Structure of Harm Reduction in the Future?

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Abstract

Human progress across various dimensions has led to changes in approaches aimed at achieving greater success. Throughout human history, people have utilized plants and medicines from their surroundings to enhance productivity. However, this use has evolved over time, and it is clear that the use of these resources will continue to increase in the future. These tools will not only improve cognitive functions but also help achieve maximum productivity. In this article, we explore the history of cognitive enhancers, assess the current situation, and discuss their future. It seems likely that, in the future, hallucinogens such as Magic Mushrooms will play a key role in enhancing productivity. As a result, the human species will need a harm reduction approach to address this phenomenon for various reasons.

Keywords: Cognitive Enhancers, Magic Mushroom, Harm Reduction, Future

1. History of Cognitive Enhancers

Many conditions and diseases, such as mood disorders, schizophrenia, and substance use disorders, impair cognitive functions (1). However, effective solutions to improve cognitive functions are still lacking (2). Throughout history, humans have sought ways to enhance cognitive abilities in individuals with deficiencies, and improving cognitive function in healthy individuals has always been viewed as a mark of distinction and superiority (3). Cognitive enhancers, also known as nootropics, are substances or drugs believed to enhance cognitive functions, memory, creativity, and motivation (4). While the use of cognitive enhancers dates back to ancient civilizations (5), it was in the 20th century that the development and use of these substances became more widespread (6).

The use of cognitive enhancers, substances that improve cognitive function, has a long history. Here are some key moments in the history of cognitive enhancers:

1.1. Ancient Times

The use of cognitive enhancers or substances that improve cognitive abilities is not a new phenomenon and has been reported in many ancient cultures. Various substances were used in ancient times as cognitive enhancers, including opium, cannabis, and mandrake (7). These substances were often used for their sedative or hallucinogenic properties, which were believed to help enhance mental function. For example, in ancient Greece, scholars and philosophers consumed a drink made from the leaves of the *Bacopa monnieri* plant to improve memory and cognitive function (8). Additionally, the Greek philosopher and scientist Aristotle wrote about the use of the herb "rosemary" to enhance cognitive abilities (9). In traditional Chinese medicine, Ginkgo biloba has long been believed to improve cognitive function and memory (10). Similarly, in Indian Ayurvedic medicine, the use of "Brahmi" or "Gotu Kola" (Centella asiatica) is believed to improve cognitive function and memory (11). The use of coffee as a cognitive enhancer can also be traced back to ancient

times. It is believed that coffee was first consumed for its stimulating effects by the Sufi religious order in the Arabian Peninsula in the 15th century (12). Furthermore, some ancient cultures, such as the Aztecs and the Mayans, used the cocoa plant for its stimulant properties, which were believed to enhance cognitive function and mental clarity (13). It is important to note that the safety and effectiveness of these substances have not been extensively studied, and some may have harmful side effects or interactions with other medications.

1.2. Middle Ages

There is limited information available regarding the use of cognitive enhancers in the middle ages. However, some historical records suggest the use of certain substances for cognitive enhancement purposes. During this time, scholars and monks often used stimulants such as coffee and tea to help them stay awake and focused during long study sessions. One such substance is coffee, which was discovered in Ethiopia in the 9th century and became popular in the Arab world by the 15th century (14). Coffee was known for its ability to increase alertness and concentration, and it was often consumed by scholars and intellectuals to enhance their cognitive performance. Another substance believed to have cognitive-enhancing properties was alcohol. Although excessive alcohol consumption can impair cognitive function, moderate amounts of alcohol were thought to enhance creativity and reduce anxiety. Wine, in particular, was considered to have beneficial effects on the mind and was often consumed by scholars and monks in the middle ages (15). Additionally, there are accounts of herbal remedies being used for cognitive enhancement. For example, the herb rosemary was believed to improve memory and concentration, while sage was thought to promote mental clarity and focus. Overall, although there is limited information about the use of cognitive enhancers during the Middle Ages, it is clear that people of this time were interested in finding ways to enhance cognitive function and were willing to experiment with various substances to achieve this goal.

1.3. 19th Century

In the 1800s, several new substances were discovered that had cognitive-enhancing properties. One of the most well-known cognitive enhancers of the 19th century was caffeine (16), which was first isolated in 1819. Caffeine was used to increase alertness and concentration and was often consumed in the form of coffee or tea. Another popular stimulant during this time was cocaine (17), which was widely used in tonics, elixirs, and other medicinal preparations. Cocaine was believed to increase energy and mental clarity, though its addictive properties were not yet fully understood. In addition to these substances, other practices were used to enhance cognitive function in the 19th century. For example, the practice of phrenology, which involved examining the shape and size of a person's skull to determine their mental and behavioral traits, was popular during this time. Some believed that phrenology could be used to identify areas of the brain that were particularly well-developed and to develop strategies for improving cognitive function. Overall, the 19th century saw the emergence of several substances and practices that were believed to enhance cognitive function. While the concept of cognitive enhancement was not yet widely recognized, many of these substances and practices would go on to influence the development of cognitive enhancers in the decades and centuries that followed.

1.4. 20th Century

In the 20th century, the use of cognitive enhancers became more widespread. During World War II, soldiers were given amphetamines to help them stay alert and focused. In the 1950s, the first nootropic, piracetam, was developed. This substance was designed to improve cognitive function without causing the side effects of other stimulants. Below is a brief overview of the history of cognitive enhancers in the 20th century:

1.4.1. Amphetamines

Amphetamines were first synthesized in the late 1800s, but it wasn't until the 1930s that they were used as cognitive enhancers. During World War II, soldiers were given amphetamines to help them stay awake and alert during long periods of combat. After the war, amphetamines were prescribed for a range of conditions, including depression, obesity, and narcolepsy. However, their addictive properties and side effects led to increased regulation and control.

1.4.2. Caffeine

Caffeine is the most widely used cognitive enhancer in the world. It is a stimulant that increases alertness and focus and has been used for centuries. In the 20th century, the widespread availability of coffee and tea made caffeine even more accessible.

1.4.3. Nicotine

Nicotine is a stimulant that increases focus and attention. It has been used as a cognitive enhancer for

centuries, but in the 20th century, the development of cigarettes and other nicotine delivery systems made it more widely available.

1.4.4. Piracetam

Piracetam is a synthetic compound that was developed in the 1960s. It was one of the first nootropics and is still used today. Piracetam is believed to improve memory and cognitive function by enhancing the production of acetylcholine, a neurotransmitter involved in learning and memory.

1.4.5. Modafinil

Modafinil is a wakefulness-promoting drug that was first approved by the FDA in 1998 to treat narcolepsy. It is now also used off-label as a cognitive enhancer, particularly by students and professionals who need to stay awake and alert for long periods.

1.4.6. Racetams

In addition to piracetam, several other racetams have been developed since the 1970s, including aniracetam, oxiracetam, and pramiracetam. These compounds are believed to improve cognitive function by increasing blood flow to the brain and enhancing the production of neurotransmitters like acetylcholine.

1.5. 21st Century

In recent years, the use of cognitive enhancers has become more common among students and professionals seeking to improve their performance. Modafinil, a wakefulness-promoting agent, is often used as a cognitive enhancer. Other substances, such as caffeine and nicotine, are also commonly used for their cognitive-enhancing properties.

1.5.1. Modafinil

In 1998, the FDA approved modafinil, a wakefulness-promoting drug, for treating narcolepsy. Modafinil quickly gained popularity as a cognitive enhancer among students and professionals looking to boost their cognitive performance.

1.5.2. Ritalin and Adderall

Ritalin and adderall, both stimulants commonly used to treat ADHD, also became popular as cognitive enhancers in the 21st century. However, their non-medical use has raised concerns about their potential for abuse and addiction.

1.5.3. Nootropics

The popularity of cognitive enhancers has led to the rise of the nootropics industry, with companies marketing supplements and other products claimed to improve cognitive function. However, the efficacy of many of these products is often unproven, and some have been found to contain harmful ingredients.

1.5.4. Brain-Computer Interfaces

Brain-computer interfaces (BCIs), which allow direct communication between the brain and computers or other devices, have been developed for a range of applications, including cognitive enhancement. While still in the early stages of development, BCIs hold promise for improving cognitive function in a variety of settings.

1.5.5. Hallucinogens

Some evidence suggests that the use of hallucinogens may improve cognitive functions by enhancing mental performance (18). Research in this area has increased, particularly in recent years, and it seems that their use will continue to expand. Some studies show that the cognitive enhancement effects of psilocybin are achieved by improving depression (19), while others demonstrate its ability to improve and correct brain functions following brain injuries (20). Studies of this nature, by focusing on and highlighting the therapeutic effects of hallucinogens, promote their use and suggest their inevitable role in the future.

Overall, the history of cognitive enhancers is long and varied, with many different substances being used for their cognitive-enhancing properties over the years. While some of these substances have been shown to be effective, others have been associated with serious side effects and addiction.

2. The Reason for the Wider Use of Cognitive Enhancers

As the world becomes increasingly complex, it seems that entering this new era requires the adaptation or enhancement of various human functions. Among these, improving and optimizing cognitive functions has become more important than ever. Expectations for enhancing these functions will surpass those for other human needs, both today and in the future. Cognitive functions, which evolved in a very different environment, are now essential in navigating the rapidly changing world. Life in this new world demands vast amounts of information and up-to-date knowledge,

which can only be processed through cognitive skills to adapt to these rapid changes.

Under normal conditions, acquiring these skills requires an educational system, which is often a slow, labor-intensive, and costly process. However, this process is not suited to the fast-paced developments in the world, nor does it account for the physiological effects of aging and death, which lead to the loss of certain abilities. Additionally, varying mental abilities among individuals make acquiring these skills more difficult and expensive. As a result, these challenges have led to the need for alternative strategies to enhance cognitive skills at both individual and societal levels, ultimately improving brain function and cognitive capabilities.

Throughout history, humankind has sought ways to improve performance, but the current era is unique. Alongside growing challenges, the technologies capable of addressing this need are also advancing. New demands, coupled with new developments, promise a world vastly different from the old one. This new world operates under the principle of non-absoluteness, meaning that there is no absolute gain or loss; rather, its outcomes are a mixture of both positive and negative consequences. The development of cognitive enhancers, designed to improve cognitive functions, is more widely discussed than ever before, and, like any other phenomenon, their use carries both positive and negative consequences (21).

Stimulants (drugs), magnetic brain stimulation, genetic modifications, and brain-computer interfaces are just a few of the technologies that have the potential to enhance human cognitive abilities. However, there are challenges associated with their use. While cognitive enhancer technologies can improve cognitive functions such as learning, memory, attention, and alertness, they may also lead to side effects such as addiction, heart and neurological complications (22), as well as social consequences and concerns related to universal and equal access to these technologies (23).

The reasons for the spread and prevalence of cognitive enhancer use can be summarized in the following points:

1. Increasingly demanding work and academic environments: As the world becomes more competitive, people are seeking ways to enhance their productivity and performance. Cognitive enhancers are seen as a way to gain a competitive edge in both the workplace and academic settings.

2. Increased awareness of cognitive health: As people become more aware of the importance of maintaining cognitive health, many are turning to cognitive enhancers to improve memory and cognitive abilities.

3. Improved access to information: With the advent of the internet and other technological advances, people now have access to an unprecedented amount of information. Cognitive enhancers are seen as a way to help individuals process and retain this information more effectively.

4. Aging population: As the population ages, there is an increasing demand for interventions that can improve cognitive function and delay cognitive decline.

5. Reduced stigma: The stigma surrounding the use of cognitive enhancers has decreased. As more people use them openly and without fear of judgment, others are more likely to try them as well. Many studies conducted on cognitive enhancers may contribute to facilitating drug use and, in some cases, lead to misunderstandings about drug usage.

It is important to note that the use of cognitive enhancers is not without risks, and individuals should consult with a healthcare provider before using them.

3. Consequences of the Wider Use of Cognitive Enhancers

While the effects of these drugs on the brain and body are not fully understood, several potential consequences could arise from their wider use:

1. Health risks: Some cognitive enhancers, such as Adderall and Ritalin, are prescription drugs intended to treat conditions like ADHD. However, when taken without a prescription or in higher doses than prescribed, they can lead to serious health consequences, including increased heart rate, high blood pressure, and even heart attack.

2. Unequal access: Cognitive enhancers are not equally available to everyone. Those who can afford to buy them or have connections to obtain them will have an advantage over those who do not. This could exacerbate existing social and economic inequalities.

3. Ethical concerns: There are ethical concerns surrounding the use of cognitive enhancers, particularly in competitive contexts such as academics and the workplace. If some individuals are using these drugs to gain an unfair advantage, it raises questions about what constitutes fair play and whether this is an acceptable way to achieve success. The use of cognitive enhancers raises ethical issues related to fairness and equality in education and the workplace, as well as concerns about the long-term health effects of these drugs. As cognitive enhancers become more widely used, it will be important to address these ethical

concerns and ensure that their benefits are balanced against potential risks.

4. Dependency: Some individuals who use cognitive enhancers may become dependent on them to achieve the same level of performance. This could lead to a cycle of increased use and dependence, which may be difficult to break.

5. Long-term effects: The long-term effects of cognitive enhancers are not yet fully understood. There is a risk that prolonged use could lead to negative effects on the brain and body, which could have implications for mental health and overall well-being.

Overall, while cognitive enhancers may offer some benefits in certain contexts, their wider use could have negative consequences that need to be carefully considered. It is important to weigh the potential risks and benefits of these drugs before deciding whether to use them.

4. Predicting the Use of Cognitive Enhancers

It is difficult to predict the future use of cognitive enhancers, as it depends on a variety of factors, such as scientific advancements, changes in regulation, and cultural attitudes toward drug use. However, based on current trends, it seems likely that the use of cognitive enhancers will continue to grow.

One factor contributing to the increasing use of cognitive enhancers is the rising demand for high cognitive performance in academic, professional, and personal settings. The pressure to perform well in exams, be productive at work, and stay competitive in the job market may drive individuals to seek out cognitive enhancers. Another factor is the availability and accessibility of cognitive enhancers. With the rise of e-commerce and online marketplaces, it is easier than ever to purchase cognitive enhancers online, often without a prescription.

However, the use of cognitive enhancers also raises ethical and safety concerns, as the long-term effects of some of these substances are unknown, and they may have unintended side effects. Additionally, concerns around fairness and equality arise, as the use of cognitive enhancers may provide an advantage to those who can afford them, thus creating an uneven playing field.

The use of cognitive enhancers is a complex issue, and its future use will depend on a variety of factors.

5. With the Possibility of Growth in the Use of Cognitive Enhancers, What Strategies Are There for the Future?

Cognitive enhancers are among the most widely used substances among university graduates today. Although the prevalence of drug use, especially in Europe, is not well known (24), some studies suggest a prevalence of 20 to 25% of drug use among students (25), meaning about a quarter of students use these drugs during their studies for various purposes, such as increasing concentration and improving memory, to perform better during exams.

As the use of cognitive enhancers becomes more widespread, it is important to consider strategies for managing their use in a responsible and ethical manner. While it may be somewhat late to adopt a strategy, the following approaches will likely be considered:

1. Education and awareness: One strategy could be to increase education and awareness about the risks and benefits of cognitive enhancers, both for individuals who might use them and for society as a whole. This could involve public campaigns, informational websites, and targeted educational programs for healthcare providers and patients.

2. Regulation: Another strategy could involve regulating the use of cognitive enhancers through government legislation or industry standards. This could include setting limits on the availability or potency of cognitive enhancers or requiring prescriptions or medical supervision for their use.

3. Research: Further research could be conducted on the long-term effects of cognitive enhancers, as well as on the most effective dosages and administration methods. This research could help inform guidelines for the safe and effective use of these substances.

4. Strict enforcement: Another strategy that is likely to be more welcomed, especially by politicians, is a forceful approach to dealing with the phenomenon, similar to supply reduction strategies. This approach could lead to more covert use of cognitive enhancers, resulting in increased societal harm.

5. Alternatives: Finally, strategies could be developed to promote alternative approaches to cognitive enhancement, such as exercise, a healthy diet, and mindfulness practices. This would help reduce the demand for cognitive enhancers while promoting overall health and well-being.

6. Harm Reduction's Role in the Future of Cognitive Enhancers

It is likely that a combination of the above strategies, with a greater emphasis on strict approaches, will occur. These combined (and potentially strict) strategies could result in more harm to young people. To address these

conditions, it is necessary to return to the principles of harm reduction, and adapting harm reduction approaches is an undeniable necessity (26). Harm reduction strategies aim to minimize the risks associated with substance use and other potentially harmful behaviors, while recognizing that some individuals may continue to engage in these behaviors despite the potential harm. Cognitive enhancers are no exception, and harm reduction strategies can be applied to their use as well.

Some harm reduction strategies for cognitive enhancers might include:

1. Educating individuals about the potential risks and benefits of cognitive enhancers, and providing information on how to use them safely and responsibly.

2. Encouraging individuals to start with low doses and gradually increase as needed, to minimize the risk of adverse effects.

3. Encouraging individuals to take breaks from cognitive enhancers, to avoid developing tolerance and dependence.

4. Encouraging individuals to avoid combining cognitive enhancers with other substances, such as alcohol or other drugs, which can increase the risk of adverse effects.

5. Encouraging individuals to use cognitive enhancers only for specific purposes, such as studying for exams or completing a specific project, rather than incorporating them regularly into their daily routine.

6. Encouraging individuals to monitor their own use of cognitive enhancers and seek medical help if they experience any adverse effects or other concerns.

Overall, harm reduction strategies for cognitive enhancers should focus on minimizing the risks associated with their use, while recognizing that some individuals may still choose to use them. By providing education and support, individuals can make informed decisions about their use of cognitive enhancers and reduce the potential for harm. However, to advance the goals of harm reduction, the support of politicians and the public is essential.

7. Which Cognitive Enhancers?

Typically, new technologies and innovations are first made available to the military and defense industries. To understand the role of cognitive enhancers, it is important to explore their presence in this sector and evaluate their military applications. The US Department of Defense has been researching cognitive enhancers for over a century (27). One key challenge faced by combat forces is overcoming fear and treating PTSD. Studies have shown that substances like psilocybin (Magic Mushrooms) have a high potential for addressing both issues, and they are used as cognitive enhancers. Additionally, Magic Mushrooms have been found to increase empathy, insight, and openness (28).

8. But Why Magic Mushrooms?

It seems that hallucinogens, particularly magic mushrooms (psilocybin), have a higher likelihood of being widely used. Several reasons can explain this trend, such as the fact that magic mushrooms are natural, which is an appealing factor for many consumers. The history of using magic mushrooms is long, and in many cultures, they have been utilized as medicine or for religious ceremonies. This cultural acceptance makes it easier to promote and integrate them into various societies. Advertisements highlighting their effectiveness in treating numerous diseases, especially on digital platforms, have played a significant role in reducing the stigma surrounding their use.

9. Conclusions

The evidence points to the growing use of cognitive enhancers, with an increasing focus on hallucinogens such as psilocybin. Various strategies may be adopted in different regions to address this issue. The history of drug policies over the years shows that harm-reduction approaches have been the most effective. At the same time, enhancing cognitive capacities in the modern world is seen as a necessity.

Focusing on psilocybin is not only about increasing cognitive abilities; some studies also show its potential in treating physical and mental illnesses. We must recognize that the modern world is more interconnected than ever, resembling a global village. As such, approaches to cognitive enhancers will likely follow a global pattern, and policymaking should reflect this global perspective.

The spread of cognitive enhancers may be discreet, but their use is likely to increase. Before this shift becomes more pronounced, it is crucial to understand these patterns, identify the advantages and disadvantages, and prevent potential problems. Extensive research should be conducted to better understand cognitive enhancers and their implications.

Today's world, unlike the past, does not necessarily require cognitive enhancers to improve attention, concentration, or emotional capacity. With greater access to information and knowledge, one of the most important factors in the modern world is the ability to

remain unaffected by emotional states such as depression, anxiety, obsession, and past traumas.

According to these factors, the cognitive enhancer of the modern age should be capable of analyzing available information and knowledge in the most effective way possible, without being influenced by emotional states. It should play a crucial role in human decision-making. Enhancing creativity, accuracy in analysis, investigation, and decision-making, as well as providing a broader perspective beyond the immediate situation, are the most important qualities for a cognitive enhancer in today's world.

Footnotes

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