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EDITED BY
Gianluigi M. Riva,
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*CORRESPONDENCE
Erik Kamenjasevic
✉ erik.kamenjasevic@kuleuven.be

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Ethical and legal considerations of mood enhancement technology

Erik Kamenjasevic*

Faculty of Law and Criminology, Centre for IT&IP Law, KU Leuven, Leuven, Belgium

Technology qualifying as human mood enhancement can be developed, on the one hand, for the well-being and mental health of their users (therapy) and, on the other hand, for changing the mood of their users above levels of normality (enhancement). Such technology provokes debates concerning its societal, ethical and legal consequences for individuals and society as a whole. This paper's aim is twofold. It first aims to show an overview of the often-occurring arguments in the ethics debate about mood enhancement technology and outline which arguments should be considered relevant for supporting the legislative debate. The second aim of the paper is to highlight some of the main legal aspects concerning this technology through the human rights lens of the United Nations, the Council of Europe, and the European Union.

KEYWORDS

mood, human enhancement, ethics, fundamental rights, regulation, recommendations

1 Introduction

Legal scholars, philosophers, and ethicists, among others, have produced a vast amount of literature looking at different HETs from their respective angles (European Commission, European Group on Ethics in Science and New Technologies, 2005; Jensen, 2019). In parallel, political institutions worldwide commissioned reports to forecast what emerging and future technologies with the potential to change human capacities might look like. These reports also urge the development of guidelines and recommendations for policies, regulation and governance of human enhancement technologies (HETs) in a socially desirable way (The President's Council of Bioethics, 2003; Coenen et al., 2009). Nonetheless, there is no agreement as to which ethical and legal arguments should be considered relevant when deciding on the acceptability or desirability of this technology. Therefore, this paper's research question inquires about the often-occurring societal, ethical, and legal challenges of mood HETs. A literature review through desk research is conducted to map and analyze the societal and ethical arguments often occurring in the ethics debate. For the legal analysis, selected human rights legislation of the United Nations (UN), the Council of Europe (CoE), and the European Union (EU) that are *prima facie* applicable to mood HETs are elaborated on and presented comprehensively. The first gives a brief overview of the notion of mood and different types of human mood enhancement technology (mood HETs) in section 2. This is followed by a short discussion concerning the definition of mood HETs and definitional issues in section 3. The paper then moves on to discuss the arguments often raised in the ethics debate concerning mood HETs in section 4. On the one hand, this debate consists of religious, ideological and rhetorical objections toward such technology (referred to as societal arguments in the text). On the other hand, the ethical framework consists of the often-occurring principles of ethics in the context of mood HETs (referred to as ethical arguments in the text). Section 5 discusses some of the main aspects of human rights legislation

from the UN, the CoE, and the EU in the context of mood HETs. Such analysis should prove helpful in spotting legal uncertainties and identifying conflicting overlaps. The final section 6 outlines the paper's main findings, provides recommendations for policymakers and regulators and highlights where further research is required.

2 The notion of mood and types of mood enhancement

Before attempting to describe different types of technology that could be used to enhance mood, it is necessary to outline what mood means. The term mood is defined as a general, diffuse and affective state or disposition (Schacter et al., 2019), which is often interchangeably used with the terms emotions and feelings. However, there are three main differences between moods and emotions. Mood is typically less intensely felt by the individual and tends to last longer than emotion. Mood is usually a reaction to a cumulative sequence of events, while emotion is often a spontaneous reaction caused by a specific event. Mood is more internal, while emotion is more external, hence visible to others. "Due to its long-lasting and private nature, mood reflects the underlying feelings of people" (Likamwa et al., 2013). Feelings are defined as episodes of consciousness (such as feeling angry or sad). Emotion includes dispositions to have certain feelings and to behave, think, and attend in specific ways (Kahane, 2011). Moods, emotions and feelings are coined under the umbrella term of the affective states, which are evolutionary adaptations guiding human responses to environmental challenges and opportunities (Wadley et al., 2020). As such, when considered undesirable or counterproductive, people may seek to change or regulate them to enhance pleasant emotions, achieve better performance, and exhibit socially acceptable expressions and behaviors.

Mood HETs are sometimes discussed as cosmetic psychopharmacology, referring to the use of psychopharmaceuticals to provoke changes in function in healthy individuals or those who show subclinical conditions (Verwey, 2020). This can be done to fine-tune personalities and increase well-being. An example of mood HETs that recently became popular among the general population concerns nitrous oxide, commonly known as laughing gas, used to develop rapid and short feelings of euphoria, calmness and a sense of detachment (Van Aerts et al., 2022). Advancements in AI systems also bring novelty in the context of technology used for mood enhancement. For example, affective AI is a rapidly growing field with the potential to influence the user's mood and/or emotion due to its technical ability to collect and process new types of data. The term concerns algorithms trained to sense, read and evaluate human emotion (Mantello et al., 2023). A distinctive characteristic of this type of technology is its ability to extract and exploit non-conscious data "gleaned from someone's heartbeat, respiration rate, blood pressure, voice tone, word choice, body temperature, skin perspiration levels, head and eye movement, and gait" (*Ibid*). Another example of affective regulation concerns human-computer interaction systems to regulate emotions to improve the mental health conditions of the user (Slovak et al., 2023).

3 Definitional issues

In order to establish the applicable ethical and legal frameworks for mood HETs, it is imperative to define them first. There is a certain level of agreement that human mood enhancement means changing the mood above levels of normality by technology or supported by technology. First, it is important to mention that the definition relies to a degree on the context within which it is being used. Moreover, implicit in most definitions of (mood) HETs is the reference to the notion of normality, which represents the first definitional issue as there is no clarity of the term. Discussing this notion here would go beyond the paper's scope, and it was done elsewhere (for analysis, see Kamenjasevic, 2022). Attached to this is the second issue, which concerns the distinction between therapy and enhancement. Such a distinction is not only meant to provide definitional clarity but is often implicitly used to define certain types of technology as morally problematic or unacceptable (Daniels, 2000; Vedder, 2013). The distinction has been heavily commented on and criticized by scholars in the field (see, for example, FitzGerald, 2008; Coenen et al., 2009). In practical terms, the distinction can, on certain occasions, be relevant for establishing the applicability of legislation, which is discussed later in this paper.

4 Societal and ethical considerations of human mood enhancement

Prior to looking into specific arguments, it is necessary to explain the way in which they were grouped and analyzed. The ethics debate dealing with mood HETs is, in fact, a debate with ethical arguments. In other words, it consists of the commonly agreed principles of ethics, such as autonomy, dignity, and identity. It also consists of other arguments that are often discussed together with ethical arguments but which are somewhat religious or ideological or even presented rhetorically. Because they are based on religion, ideology, or metaphysics, for clarity's sake, they are referred to as societal objections in this paper. Moreover, these arguments are sometimes presented in a manner that does not allow for discerning whether the objections they present are against enhancements of individuals or of a whole species or between enhancing oneself or enhancing another (such as the offspring or a completely different person). Even if they do not have an ethical character and are sometimes presented rhetorically, the fact that they are often raised in the debate about mood HETs, the mentioned arguments cannot be ignored when analyzing this topic.

4.1 Societal objections

The mood enhancement debate is often based on arguments that have religious, rhetorical and ideological rather than ethical character. They seem to reflect particular world views, including metaphysical presuppositions, as they boil down to the idea that either god or nature has imposed limitations on human capabilities and performance, which should not be exceeded. Vedder (2013) groups these arguments under the term 'the given limitations of nature and culture' cluster.

The first objection within this cluster is about the unnaturalness of mood HETs. Those referring to it fear these technologies could alter human nature because they interfere with it or supersede it (Kudlek, 2021). Moreover, they also fear these technologies have the power to undermine humans' ability to ascertain good, without which people cannot make coherent, defensible judgments (Buchanan, 2009). The

following argument revolves around the idea that developing or using HETs goes against god's vision of the world and humans (Veatch, 2016; Mizarhi, 2020). The argument is closely linked with the discussions about the unnaturalness of HETs. Those who agree with this argument but are perhaps not necessarily following any religious doctrine express a more general fear that concerns possible negative consequences that the development and use of the new HETs could provoke. Furthermore, HETs might blur the line between therapy and enhancement on certain occasions, and sometimes, certain technologies developed for therapeutic purposes might be capable of enhancing specific human capacities, willingly or not. According to some authors (Hofmann and Svenaeus, 2018), this might further aggravate the issue of medicalization and impact some traditional ways of solving problems, which some authors in the debate do not find desirable. Although such an opinion appears to a certain extent popular and assimilates the idea behind the unnaturalness argument, most academics do not wish to use it to oppose HETs' usage (Thomas, 2021). That is primarily because they believe there are also occasions when these technologies provide new ways of alleviating pain and helping individuals feel self-control. In such a way, mood HETs promote respect for human dignity and autonomy by allowing individuals to choose what they find to be an appropriate way to improve their well-being. According to the cheating argument raised in the debate concerning mood HETs, those referring to it find that when an individual uses technology to improve some skills or abilities, this should be considered cheating, and whatever the outcome, it should be valued less (Vedder, 2013). Based on this objection, individuals using HETs are sometimes seen as living an easy life with trivial achievements and pressured into adopting standards of beauty, physical and mental efficiency in studying, working, sports performance, and society in general (Schermer, 2007; Schermer, 2008). However, a lot depends on the context within which the HET is used, who uses it, and for which purpose. For example, if a surgeon uses HET to improve concertation during a long surgery, she will typically not be judged as cheating at work if, with the help of this HET, she saves the patient's life. Some authors suggest legalizing specific HETs to narrow the gap between those using and not using them (Savulescu, 2006; Rakić, 2021). This would allow for solving issues, such as transparency about the HET at stake, safety, fair distribution, and coercion. Selfishness is another argument used to oppose HETs, but most of the time, only indirectly, by hinting or referring to it through another objection. The idea behind this argument is that one puts her interests ahead of those of others at their cost or under conditions that contribute, for instance, to unacceptable inequalities or exclusion of fair competition (Vedder and Klaming, 2010). Although when some use HETs, this might be for selfish reasons, some authors find that using certain HETs might have the exact opposite effect as it might result in more altruism among individuals, which is the case in the abovementioned case of the surgeon using HETs during surgery (Persson and Savulescu, 2012).

4.2 Common features

There are several overarching features concerning the abovementioned arguments. First, these arguments separately do not necessarily fall only within one of the three categories (ideological, religious, or rhetorical). Instead, they often overlap and connect to a certain extent, and above all, their underlying messages are occasionally very similar but expressed differently. For example, the unnaturalness and playing god arguments revolve around the similar idea that the status quo of what was given or created (by nature or god) should not be changed with technology. Furthermore, even if these arguments are not about typical questions of ethics, authors discussing them also often refer to the principles of ethics to make their points. For example, when talking about the unnaturalness argument, authors also refer to HETs' potential to impact or change the identity of individuals and HETs' influence on people's autonomy, authenticity, and human dignity. Third, another overarching characteristic of these arguments is that authors referring to them regularly use examples of HETs that do not yet exist but could be found in, for example, sci-fi films to show how profound an influence on different aspects of human life a HET they discuss can provoke. It is evident that by imagining the various abilities of HETs (in terms of what they can do, their impact on individuals, etc.), it is also possible to predict and make alarming warnings about serious risks and threats they could provoke to individuals and society. These arguments often represent or are a product of fears about the imagined change, impact, or novelty HETs might bring to different spheres of life of individuals and society. Most of the time, they are invalid because they are not based on a clear description of the HET but on a rather generic and imaginary view of all kinds of HETs. Therefore, arguments with such a basis are difficult to resolve through a common and objective understanding. Instead, only those arguments that are based on a clear explanation of the technology and its ability should be considered for further analysis of the technology.

4.3 Ethical arguments

Next, to the societal objections, the debate also concerns common ethical principles. They can be defined as standards of right and wrong that prescribe what humans ought to do, usually in terms of rights, obligations, benefits to society, fairness, or specific virtues, ideals and aspirations (Andre and Velasquez, 1987/2010). Hence, when ethical issues appear in a debate about new technologies, this might imply that there is a clash between the mentioned values of individuals on the one hand and the risks these technologies could pose to these values on the other hand. This section provides a brief overview of arguments concerning mood HETs dealing with justice, identity, autonomy, dignity, privacy, and safety and prevention of harm.

4.3.1 Justice

The principle of justice, particularly distributive justice, is discussed in the HET debate when developing or deploying a specific HET entails individual privilege. Many authors fear that introducing HETs might provoke an increase in inequality should their regulation remain within the scope of the free market since only a smaller group of people will be able to afford them, at least during the early days of their availability (Palazzani, 2019; Desmond, 2021). A group of authors discussing justice calls for examining not only the consequences of this technology but also more rooted issues, such as why some have access to the technology and others do not, as well as how this could impact their access to different opportunities. While doing so, what must be considered are social contexts, where those that are differently socially positioned, such as people with disabilities,

would be able to express their perspectives and views about the HET at stake and how it might or could affect them (positively or negatively) considering their specific context (Klein et al., 2015). Next to the distributive justice issue posed by HETs, the issue of resource allocation might also become pressing should investments in HETs result in disinvestments in prevention, care, treatment of diseases, or other innovations that others could need more (Palazzani, 2019).

4.3.2 Identity

The following issue discussed in the debate concerns HETs' influence on personal identity. Some authors fear that identity might be radically changed and influenced by HETs, directly affecting the individual using that HET and provoking indirect consequences for people around her (Gaitan, 2021). They also predict that these changes to identity could also affect individuals' autonomy and authenticity by undermining their ability for self-expression. Next to this, some authors fear that identity could become a commodity, which will deprive people of the merit of achievement and of experiences and lessons with a pedagogical value that, according to them, HETs cannot provide (Gaitan, 2021). Mood HETs might also influence the identity of their users when their privacy settings are flown (discussed below).

4.3.3 Autonomy

Three groups of authors have different views about how HETs influence an individual's autonomy. Some argue that HETs negatively impact an individual's autonomy when the technology does not function properly or functions too well, so it nudges the HET user to act in a way she would typically not (Sandel, 2009). Another example of the negative impact of HETs on autonomy is when, due to the social pressure to use HETs (for winning in sports or job competitions, for instance), HETs might heighten the tendency to compete rather than cooperate (Palazzani, 2019; Errigo, 2020). Moreover, this is closely linked to authenticity, whereas authors fear that people under the influence of a HET might feel as if they do not lead a life that is their own, have a personality change in a way that is not theirs truly, and lose their self-respect (Schermer, 2013). The second group of scholars believe HETs positively impact human autonomy (and dignity) because they become a means for the self-expression of individuals. According to them, respecting people's choices to be enhanced means respecting their autonomy. If HETs were banned, this would go against the principle of autonomy (Minerva and Giubilini, 2018). The third group of scholars reject the one-size-fits-all approach toward autonomy due to the cognitive diversity of individuals. As a solution, they propose that a context-sensitive approach should be used to approach an individual's autonomy to different degrees instead of judging that person only as having or lacking autonomy. Based on such an approach and by considering how much value a person gives to her autonomy in a given context, HET's influence on that person's autonomy can be established (Veit et al., 2021).

4.3.4 Dignity

The principle of human dignity is also discussed in this context. Those who argue about HETs' positive impact on dignity mainly discuss that within the context of individuals' health and well-being. This, to a greater extent, overlaps with the autonomy argument (Raposo, 2019). Those who talk about HETs' negative impact refer to discrimination and stigmatization to make their point (Kodelja, 2021). As some fear, HETs might induce new stigmas in some aspects of life (such as feeling sad; UNESCO International Bioethics Committee (IBC), 2015). Here, they also refer to medicalization and the fear that HETs might help to label certain moods or feelings as unwanted. Moreover, the authors also discuss the issue of distributive justice, where the dignity of those with limited access to HETs might be impacted.

4.3.5 Privacy

The same applies to risks posed by processing new personal data types. As this is becoming more complex in terms of quantity and novelty concerning types of personal data with technological advancements in enhancement technologies, new questions about protecting individuals' privacy appear. Namely, HETs might be able to reveal information about individuals' moods that are unavailable to others today as long as they do not want to share it intentionally (Burwell et al., 2017). Consequently, any data breach might result in severe and long-lasting consequences for individuals. For example, a privacy breach concerning data about an individual's mood might affect her identity and personality and interfere with her actions' authenticity because something private to her only now becomes available and accessible to others. This can also influence her autonomy as she might be discouraged from using the HET, even if it would otherwise improve her well-being. The collection of this type of data (for example, by employers or insurance companies) could also lead to coercion, stigmatization and new forms of discrimination (Häuselmann et al., 2023).

4.3.6 Safety and prevention of harm

Closely linked to privacy is the concept of safety and prevention of harm. In the context of mood HETs, the potential harm caused by this technology will often concern only the individual who is using it. Hence, the authors discussing HETs' safety propose that in the case of conflict between the safety measures and freedoms of the user, and by applying the harm-benefit test, the priority should be given to the principle of respect for the user's autonomy as long as the potential harm does not disproportionately outweigh the principle of non-maleficence (Verwey, 2020). Particular attention should be given to users' different age groups. To obtain information about the safety of HETs in the development stage, the authors call for structured and controlled testing of HETs on healthy individuals (Palazzani, 2019).

4.4 Interim remarks

The analysis of the often-occurring ethical arguments shows that mood HETs bring two or more of them simultaneously into question. For example, a breach of privacy in the context of mood HETs can impact other principles, such as the users' autonomy, identity, and dignity. At the same time, overlaps and parallels between different arguments are not always clear and valid. This is the case, for example, with dignity, where authors also discuss issues of cheating and unnaturalness. Second, despite being extensively analyzed in the literature, not all ethical concerns are raised due to the usage or production of the technology itself. In some cases, the reason for such a concern lies in the pre-existing and unresolved problems in a given society. Concretely, this seems to be the case with the issue and consequences of distributive justice, which happen despite HETs. An open question about which there is not yet agreement in the academic

discourse is whether HETs contribute positively or negatively to the issue of distributive justice and whether they should be allowed access to the market. The regulators and policymakers must ensure that the barriers to accessing HETs are tackled first to prevent HETs from further increasing the gap between those who can and cannot afford and benefit from them. Third, some ethical arguments also turn out to be based on very improbable scenarios and unrealistic expectations about what HETs can do (just like it is often the case with the arguments falling within the 'given limitations of nature and culture' cluster). As such, arguments that have such a basis can quickly be resolved by excluding them from regulatory discussions. For example, this is the case with the problem of HETs' impact on personal identity presented in the context of the unnaturalness argument, which should be avoided. Fourth, for some arguments, it is difficult to clearly state whether they are valid or not due to a lack of available information about HETs. This is particularly the case with HETs' impact on individual autonomy. The need to establish clinical trials of a specific HET in healthy individuals is often mentioned in order to understand if these technologies positively or negatively impact HET users. Without these trials, making usable policy decisions is difficult as the literature does not provide conclusive answers since authors on both sides of the debate propose sound theoretical arguments.

5 Current regulation of human mood enhancement

Three legal systems—UN, CoE, and EU—are committed to promoting and respecting human rights. Analyzing their applicability and pitfalls in the mood HETs context is essential for ensuring that they are designed, marketed, and used in a manner that upholds fundamental rights, safeguards individuals' well-being, and endorses ethical principles. Their analysis helps to understand whether the current systems provide adequate protection to individuals using mood HETs. This section outlines some aspects of the applicable legislative instruments concerning mood HETs by looking at rights and principles commonly discussed throughout three legal systems. Next to this, this section outlines areas where mood HETs might pose risks to their users for which the current legal systems do not envisage protection, which potentially creates legal uncertainties.

The principle of human dignity is the basis of human rights instruments of the three legal systems (see, for example, UN General Assembly, 1948; Council of Europe, 1997a,b; Charter of Fundamental Rights of the European Union, OJ C 364/1, 2012). Mood HETs must respect the dignity of individuals by ensuring their bodily integrity, protecting their identity, and sustaining their autonomy. Recently, the explanatory report to the CoE AI Convention (Council of Europe, 2024) recognized emotions as an important aspect of humans which should be protected as part of the principle of human dignity (Council of Europe, Draft Explanatory Report, Draft Framework Convention on artificial intelligence, human rights, democracy and the rule of law, 2024). Despite not explicitly referring to moods or other affective states, these should nevertheless be considered within this legislator's intention. This principle prohibits stigmatization, discrimination, or coercion related to the usage of mood HETs. Because of its broadness, new and emerging technologies such as mood HETs fall within the scope of this principle, which also serves as an anchor for the application of other rights granted by these legal instruments, or it might even serve for reinterpretation of those rights. Inseparable from the principle of dignity is the informed consent for medical treatment and the use of mood HETs. To pass the validity threshold, the user must be provided with comprehensive information about the risks and benefits of mood HETs. Fully informed consent is the basis for enjoying the right to health and a cornerstone of an individual's autonomy. As clinical trials with mood HETs in patients and healthy participants are often lacking, the person in charge of prescribing mood HETs will not be able to give comprehensive, detailed and complete information about existing and potential future risks of using mood HETs. Therefore, clinical trials examining mood HETs' impact on patients and healthy individuals should be established to mitigate this issue. Such trials will not only help solve the problem of informed consent but will also enable future users to understand how this technology might impact different aspects of their autonomy, personal identity, privacy, and safety. However, even with this information available, obtaining informed consent is further complicated by the complexity of the information given to the user. Therefore, the mood HET user should always be aware of the uncertainties and risks of mood HETs and the professional role of the person prescribing mood HETs. If a healthcare professional administers the HET, higher professional standards have to be observed than if an over-the-counter vendor does it. In the former scenario, legitimate expectations of future HET users about the healthcare professional's knowledge concerning risks are higher. Hence, an option that could help introduce the new HETs and obtain valid informed consent could be the obligation to have them prescribed by healthcare professionals having a responsibility to monitor their usage and report any new or existent side effects to HETs' manufacturers as well as the right to interrupt their usage (Directive 2001/83/EC, 2001). The human dignity principle is exercised through the right to physical and mental integrity. Mood HETs can compromise both forms of integrity. The physical integrity of the user may be impacted when this technology does not function well and according to its manufacturer's specifications. Apart from having consequences for the user's safety, cyberattacks on mood HETs that are connected to a network can also provoke harm to the mental integrity of the user by unauthorized mood alterations.

Mood HETs can positively or negatively impact users' identities. Their availability in the healthcare market can help user empowerment by providing a means to care for their health and well-being. At the same time, changing the mood through technology can also provoke unwanted consequences through access to information not intended for sharing by the user. In order to ensure the protection of the development of personal identity and self-determination of mood HET users, the three legal frameworks give users the right to have full control over their bodies and minds and that any use of mood HETs respects and preserves their inherent identity without interfering with the possession of the information users share or receive. To this end, privacy plays a focal role as it prevents the misuse of mood HETs from unlawful or arbitrarily interfering with their private sphere. Together with the principle of autonomy, the right to privacy also aims to prevent coercion, stigmatization, and discrimination against users. As mentioned above, technology with access to data concerning mood is capable of exploiting information about people that was, until today, impossible to collect without the explicit intention of the user. For this reason, the current interpretation of the notion of privacy must be broadened to include

the protection of the mental privacy of users. This broader interpretation should include personal data that is internal to the user and to which that individual has a reasonable expectation of privacy. Closely linked to this is the right to data protection as recognized by the three legal systems (Council of Europe, 1950; Charter of Fundamental Rights of the European Union, OJ C 364/1, 2012; Council of Europe, 2018). The issue that concerns this right might appear when data concerning mood is derived from data which do not fall within the definition of a recognized data category (such as data concerning health). Data concerning mood is not, *per se*, recognized by any legal instrument (compare with Häuselmann et al., 2023). Prior to recent developments in affective AI systems, among others, data concerning an individual's mood were not available for technology to collect and process. To ensure the necessary level of protection of data subjects whose data concerning mood are processed by mood HETs, these data should be recognized as a special category of personal data.

As presented above, one of the ethical challenges mood HETs might pose concerns distributive justice. This is addressed through several legislative instruments, such as the Universal Declaration on Bioethics and Human Rights (UNESCO, 2006), the Oviedo Convention, and the Charter of Fundamental Rights of the European Union, through the promotion of equitable access to healthcare. However, the question that poses itself is whether mood HETs should be considered as technology designed to improve a person's state of health as they can positively impact the mental health and well-being of their users despite their intended purpose is not therapy but it is enhancement. It could be argued that despite their characterization as enhancement technology, they are also inherently healthcare technology. Consequently, the State Parties to international legal instruments must ensure that mood HETs are equally available for everyone, without unjustified discrimination. Attached to this is the right to health, which is a fundamental right of every person recognized by the three legal systems. This right is often defined by referring to the concept of well-being (see World Health Organization, 1946), which includes not only the basic necessary health needs but also all socioeconomic factors that may impact a person's overall quality of life. This way of defining health requires discussing the distinction between therapy and enhancement once more, as it might also have important consequences for the application of, for instance, the EU secondary legislation. Concretely, to establish the EU Medical Device Regulation's application, what matters is the intended purpose of the manufacturer. Such purpose must be medical (see Article 2(12) of Regulation (EU) 2017/745 of the European Parliament and of the Council of 5 April 2017 on medical devices, 2017). If enhancement does not mean medical purpose, the manufacturer can avoid the obligations stemming from that Regulation, which might pose certain risks to the users' safety. Hence, what should be at the core of the issue is the factual improvement of health and well-being. In such a case, therapy and enhancement could be considered as one notion since maintaining the distinction without proper analysis of the technology, its impact on users, and risks and benefits could have negative consequences on the health and well-being of users should the technology be ethically dismissed and legally qualified as being enhancement.

Moreover, the right to health is linked with the right to the enjoyment of the benefits of scientific progress. Mood HETs, like other technologies, are a product of science that offers its users mental health and well-being benefits. Based on such interpretation, the three legal regimes do not prohibit mood HETs as long as their benefits are proven and risks for potential harm to their users do not outweigh those benefits. This also applies in the context of the prohibition of inhuman and degrading treatment, which prevents mood HET usage to inflict harm, cause suffering, or violate an individual's dignity, autonomy or any other fundamental right granted through these legislative instruments. Furthermore, mood HETs used to analyze people's moods accurately might provoke chilling effects by impacting the freedom of thought granted under human rights instruments of the UN, CoE and EU. This right grants everyone the right to develop, refine or change their thoughts without being coerced, discriminated against, or stigmatized. However, prior to new technological developments, especially in affective AI systems, thoughts were considered internal and private to the person. With these technological developments, it is necessary to broaden the scope of this right as technology such as mood HET might be able to access them without users intent to share them. Linked to this is the right to express an opinion. Unwanted and unlawful interference of mood HETs could be done for commercial purposes, political motives, or any other occasion where knowing a person's mood could be used for a specific advantage. For instance, people can be coerced into taking or changing their viewpoints unwillingly. Exercising these rights often happens and might provoke severe consequences in the public sphere, such as in the employment context. For this reason, an important legal instrument is the ESC (Council of Europe, 1996), which protects workers' rights, including the right to just conditions at work and safe and healthy working conditions. In the context of mood HETs, this principle ensures that individuals are not subjected to any adverse effects or risks arising from their use in the workplace. Importantly, neither of these instruments allows the mandatory use of mood HETs to be imposed.

6 Conclusion

This paper provided an overview of societal, ethical and legal considerations concerned with mood HETs. It first outlined the definition of such technology and the two main definitional issues: normality, the concept which is important to keep in mind as a reminder of the importance of the context within which the enhancement technology is used, and the distinction between therapy and enhancement, which has important and practical implications for the applicability of several legislative instruments discussed in this paper. The paper then shortly outlined rhetorical, ideological and religious objections toward mood HETs. As shown, their relevance is limited since they often represent or are a product of fears that technology might bring to different spheres of life of individuals and society. Moreover, they are frequently invalid because they are not supported by a precise description of the HET at stake but rather a general description of all different kinds of (existing and non-existing) enhancers. At the same time, the often-occurring ethical arguments seem to be raised together with two or more arguments. Some might be raised due to the novelty and disruptiveness brought by the enhancement technologies, but more often, they resurface due to some pre-existing and unresolved issues in the society where the HET is introduced. Most importantly, the proven impact of mood HETs on given ethical principles is, at this stage, mainly theoretical due to the lack of clinical trials performed with patients and healthy individuals. Furthermore, human rights instruments from the UN, CoE, and EU are overall flexible enough to include mood HETs within the ambit of their application. Still, there are several legal uncertainties spotted within the three legal systems that must be addressed to provide

sufficient protection to future HET users. In particular, these concern obtaining valid informed consent, allocating responsibility to administer and prescribe mood HETs, reinterpreting, and extending notions of privacy, integrity, and freedom of thought and expression. Moreover, there is a need for a clear definition of data concerning mood. Finally, it is crucial to examine the distinction between therapy and enhancement further and take a normative stance on whether sustaining such distinction can be beneficial.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

EK: Writing – review & editing, Writing – original draft, Investigation, Funding acquisition, Formal analysis, Conceptualization.

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Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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