

Chapter 7

With Cognitive Enhancement Comes Great Responsibility?

Hannah Maslen, Filippo Santoni de Sio and Nadira Faber

Abstract Although drugs that enhance the cognition of ‘healthy’ individuals (e.g. methylphenidate and modafinil) have received attention from ethicists and philosophers, little research has focused on the concrete opportunities they present for particular groups in society. Recent policy discussion has gone as far as suggesting there may be a moral obligation for individuals in high-risk professions (e.g. surgeons, pilots) to take enhancers. This chapter outlines a theoretical framework and methodology for investigating the claims that some professionals: (a) might have a responsibility to enhance and (b) might acquire more responsibilities once enhanced. Our methodology is interdisciplinary—as we examine normative hypotheses alongside psychological data and legal precedent—and practice-oriented—as we ultimately aim to make recommendations for policy and the professionals within its remit. Philosophical analysis exposes the conceptual and normative questions involved in a discussion of enhancement in professional contexts, offering and refining definitions of concepts (capacity, responsibility) and theory about their relationship. Psychological inquiry uses surveys and

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H. Maslen (✉)

Uehiro Centre for Practical Ethics, Suite 8, Littlegate House, 16/17 St Ebbe’s Street,
Oxford OX1 1PT, UK

e-mail: hannah.maslen@philosophy.ox.ac.uk

F. Santoni de Sio · N. Faber

Department Values, Technology, and Innovation, Section of Ethics/Philosophy of Technology,
Delft University of Technology, Jaffalaan 5, 2628BX Delft, The Netherlands

e-mail: f.santonidesio@tudelft.nl

N. Faber

Department of Experimental Psychology, University of Oxford,
9 South Parks Road, Oxford, OX1 3UD, UK

e-mail: nadira.faber@psy.ox.ac.uk

experimental methods to collect data from lay people and professionals on attitudes and responsibility attributions associated with enhancement. Legal analysis examines the conditions under which professional duties to enhance might emerge and how the law might impose or limit liability.

Keywords Cognitive enhancement • Capacity • Modafinil • Reflective equilibrium • Responsibility • Ritalin

7.1 Introduction

Recent research suggests that some medications such as methylphenidate (e.g. Ritalin) and modafinil (e.g. Provigil), which were originally created to treat conditions like attention deficit hyperactivity disorder (ADHD), narcolepsy, shift work sleep disorder and excessive daytime sleepiness might also improve certain aspects of mental performance when taken by healthy individuals. For instance, methylphenidate has been shown to have modest effects on response inhibition, working memory, attention and vigilance; modafinil has been shown to have modest effects on working memory, episodic memory and attention (Husain and Mehta 2011). Given these effects, might there come a day when people are expected to take such drugs?

We think that this is not an altogether unlikely scenario. Consider for instance the following discussion and recommendations published by Queensland Health, the medical regulatory body of the North-East Australian state, in their Fatigue Risk Management System Resource Pack:

To meet the needs of patients at any time of the day or night, ... doctors and other health-care workers ... often work long hours — throughout the night and on-call over weekends, public holidays and other times of need. This presents us with the challenge of fatigue and its associated risks to staff and patients. To meet this challenge, fatigue risk management must be included in our core business operations. (2009:1)

As a possible solution, the Queensland Health report suggests that doctors could take '[n]aps of less than 30 min in length [t]o provide measurable boosts in alertness and performance' (77) and up to '400 mg of caffeine [which is the] equivalent to about five to six cups of coffee' (78) because '[c]ompared with other psychoactive drugs (e.g. modafinil), caffeine is ... more readily available and less expensive' (79). However, given the drawbacks of napping [the report cites 'sleep inertia effects' which involve a 'period of disorientation and performance impairment that is experienced immediately upon waking' (77)], that caffeine is not well tolerated by everyone (78), and that the cost and availability of drugs like modafinil could change with changes in regulation, it is perfectly conceivable that a future report may recommend that such drugs be used.

Further, the report from a recent workshop on 'Human Enhancement and the Future of Work', hosted by the Academy of Medical Sciences, the British Academy, the Royal Academy of Engineering and the Royal Society (2012)

considers that there may in fact be a moral obligation for some individuals to use enhancers at work:

[O]ccupations that require particular patterns of focus could benefit from enhancements that facilitate achieving such patterns. For example, surgeons may need to be able to concentrate for extended periods, whereas other jobs such as air traffic control can require very rapid reactions during periods of relative uniformity. As an extrapolation to this, it is possible that in these high-responsibility occupations enhancement could be seen as a moral obligation, or even demanded by the public. Recent examples of traffic accidents involving passenger coaches draw attention to the drivers of these vehicles as another potential target for such demands. Situations like this will require careful consideration [p38]

The above concerns are of great importance to public policy. However, cognitive enhancement drugs also raise important philosophical concerns. In a paper that explores the relationship between different senses of the word ‘responsibility’, Vincent (2011) proposes that a central underlying assumption of much of our reasoning about responsibility is the capacitarian idea that responsibility tracks mental capacity. To elucidate this co-variation, Vincent provides a range of examples:

[I]n lay contexts responsibility is often thought to require such things as the ability to perceive the world without delusion, to think clearly and rationally, to guide our actions by the light of our judgments, and to resist acting on mere impulse. This is, for instance, why children, the senile, and the mentally ill are thought to be less than fully responsible for what they do (i.e. because they lack the right kind and/or degree of mental capacity), why children can acquire more and/or greater responsibilities as they grow up (i.e. because their mental capacities develop as they mature), and how responsibility is reinstated on recovery from mental illness (i.e. because the needed mental capacities are recovered).

Elsewhere, Vincent (2013) elaborates on this idea by arguing that if the capacitarian thesis is right, then it seems that as capacities are enhanced beyond the ‘normal’ range the people in possession of these capacities might in some sense become ‘hyper-responsible’. This might mean that they incur *new* or *greater responsibilities*—that their duties multiply and extend (c.f. also Santoni de Sio et al. 2014a, b). It might also mean that these people should be held *more responsible*—are more blameworthy—when things go wrong. If this theory is correct, then there are obvious implications for professionals who use enhancers: once enhanced, more will be expected of them, both in terms of the set of things they are expected to do and the level of proficiency with which they are expected to do them.

The performance-improving effects of cognitive enhancers on professionals engaged in particularly challenging tasks poses an interesting question: does cognitive enhancement enhance responsibility? The question can be split in two parts: (a) might individuals engaged in certain high-risk professions have a responsibility—a duty—to enhance? and (b) are these individuals, once enhanced, more responsible—more accountable—for what they do?

Intuitively, both questions could receive a positive answer. On the one hand, it seems that, for the same reasons for which professionals operating in high-risk situations may be required to use all the technologies available to reduce the probabilities of mistakes, they might (sometimes) also be required to enhance their

mental capacities through a pharmacological intervention (provided this had no or negligible negative side-effects on their health). On the other, as we accept that responsibility is diminished when mental capacities are lowered, it seems that we should accept also that responsibility might be increased through mental enhancement.

7.2 Cognitive Enhancement and Responsibility: Goals and Means of the Inquiry

To comprehensively test these two claims in a way that is useful for making recommendations for policy, a wide-ranging assessment of these hypotheses is required. In order to do so, at least three elements seem to be necessary: a deeper understanding of the concept of ‘capacity’ and of its relationship to responsibility, an understanding of the views of professionals and the general public on the subject, and speculation on the potential legal ramifications of various positions. Thus, to a certain extent, we follow others in taking the ‘participatory turn’ identified in Chap. 1 of this volume (Koops 2015). However, we emphasize that the importance of listening to stakeholders in innovation processes does not eliminate the need for robust conceptual and normative analysis (cf. Santoni de Sio et al. 2014a, b). Thus, philosophical, psychological and legal modes of inquiry should ultimately coalesce to reach conclusions on the interrelated facets of the debate. On the basis of these results it will be possible to offer responsible recommendations to policy-makers and innovators on this issue.

Answering the normative and conceptual questions about cognitive enhancement and responsibility therefore requires bringing together multiple modes of inquiry. We need to understand the concepts involved and the relationship between them; we need to understand lay and professional beliefs and attitudes; and we need to understand the legal context, which might restrict or lend support to particular approaches. In fact, it is not clear that the philosophical goal of clarifying concepts and relations can be met through philosophical analysis alone: lay intuitions and reflections from professionals about enhancement and responsibility, and legal concepts of duty and negligence can usefully feed into philosophical inquiry. This approach is known as the method of ‘wide reflective equilibrium’ and is explained in greater detail below.

Thus, to achieve the two primary goals—philosophical understanding and policy recommendation—there is a need to engage in these three strands of research. *Philosophical* analysis exposes the conceptual and normative questions involved in a full discussion of enhancement in professional contexts; it offers definitions of concepts and theories about their relationship, whilst also seeking to refine or review said definitions and theories; it works through the normative implications of the refined theories for professionals in their respective contexts.

Psychological inquiry uses surveys and experimental methods to collect data on attitudes and responsibility attributions from lay people and professionals. These

data serve as a source of ideas for normative analysis, are useful in exposing any philosophical bias, and enable the policy recommendations to be made in full awareness of professional and public opinion.

Legal analysis enriches the conceptual analysis through bringing its own definitions of capacities, duties, responsibility and negligence; it analyses the issues that a claim of negligence relating to a failure to enhance would raise for the court; it draws on any analogous cases to try to ascertain what authority or transferable principles, if any, there might be. The next three sections elaborate on each of the three strands in turn. Our approach can be seen to correspond to the ‘product approach’ characterized by Koops (2015). Accordingly, we demonstrate the way in which our theoretical framework and methodology would promote responsible policy-making in the context of the pharmaceutical cognitive enhancement of various professionals.

7.3 Philosophical Analysis

Philosophy must assess whether the straightforward extension of capacitarianism that Vincent envisages extends to the enhanced range or, alternatively, whether the relationship is complicated by countervailing considerations. In order to do this, the philosophers should employ the method of wide reflective equilibrium. The method of wide reflective equilibrium is often used to find and justify solutions to moral and political puzzles. It is a deliberative process that begins with a priori moral intuitions, principles and theory, and then tests and revises the attendant beliefs alongside each other, and alongside competing theories and empirical facts about the world with the overall goal of reaching coherence (see Rawls 1971). The initial beliefs about an area of inquiry are revised in this manner until the most coherent and credible set is arrived upon.

The method of wide reflective equilibrium may be particularly fruitful when drawing on data from the psychological strand, using the data as a source of ideas, and also as a yardstick against which to test tentative conclusions. In wanting to know whether lay people attribute responsibility in a way consistent with the capacitarian thesis, the philosophers are not necessarily hoping for or expecting consensus. However, great divergence between lay and philosophical theories of responsibility puts an extra burden on the philosophers to explain why their theory is justified. Insights into attributional biases in lay people can help clarify where there is real rather than symptomatic disagreement.

The capacitarian hypothesis is exposed to two very general conceptual objections: firstly, it might be asked whether the mental *modification* produced by drugs like methylphenidate and modafinil should qualify as a mental *enhancement*, i.e. as an *improvement* of the subject’s mental conditions. This objection highlights that it may not always be good to enhance memory, attention, or wakefulness, as these modifications may also hinder the pursuit of other valuable things. For instance, the ability to forget can be as important as the ability to remember, and

forgetting is often necessary to cope with and go through stressful or painful personal past experiences. Therefore—so the objection goes—enhancement is not an absolute but relative concept since it cannot be applied without reference to a specific context of evaluation. Whilst the general point of this objection can easily be accepted (see Santoni de Sio et al. 2012), this does not seem to be a problem for our specific hypothesis. The relevant assumption here is not that methylphenidate or modafinil constitutes a source of mental enhancement *in general*, but that these drugs may constitute a form of mental enhancement at least *for certain professionals* (surgeons, pilots and soldiers) *when they are engaged in particularly challenging tasks typical for their professions*. This limited assumption seems to be much less controversial and open to criticism.

Suppose, though, that the most that such drugs could be claimed to do, or that the most appropriate way to describe what they would do, is that they would only treat what is ultimately a dysfunction, rather than to raise people's mental function to better-than-normal levels. For instance, that they might temporarily wipe away fatigue-induced mental cobwebs and sluggishness, and return their user to normal rather than genuinely enhanced levels of mental function. It would then seem that this should count as a form of *treatment*, rather than of *enhancement*. Nevertheless, we take it that in an important sense what such drugs would do should still be described as a form of enhancement, since people who used them (or who had access to them and were prepared to use them) could do things that others could not do as effectively—e.g. late-night cramming for an exam the next morning, actually sitting that exam with few or no hours' sleep, or working exceedingly long hours to meet a deadline. Relative to a baseline of normal performance, which takes in to account naturally-occurring performance degradation due to common maladies like tiredness, such individuals would be enhanced.

Another objection to the capacitarian hypothesis derives from the concern for *authenticity*. In a nutshell, the argument is that the cognitive capacities enabled by a particular drug are not truly the capacities of the enhanced person. If this position is taken seriously, then it could be argued that—*contra* the hypothesis—the enhanced person is actually *less* responsible for the things that he does because, post-enhancement, his behaviour is not (completely) attributable to him, but to an inauthentic self. Whilst this is an objection that needs careful consideration, it must be noted that it is not in itself a fatal blow to the extended capacitarian thesis. The objection is seated in a concern about unnatural, external means of becoming enhanced, which do not exhaust all the possible means of enhancing capacities. The kind of circumscribed mental modification discussed here should not therefore raise particular concerns in this perspective.

More generally, the worry about authenticity and responsibility seems to derive from a naïve view of the nature of responsibility and its relation to the self (see Santoni de Sio et al. in press). According to this view, the reason why people persist over time despite continually undergoing changes is because something about them—some essential core—remains unchanged through different times and situations. On this view, responsibility for actions is legitimately attached to people

only when their actions stem from this unchanging part of the self. In this perspective, all relevant modifications of the self are a potential threat to the subject's responsibility. Discussing this view in detail would require more space than this forum permits, but suffice it to say that in our view it is more plausible to accept that humans change—often quite substantially—and to accommodate responsibility within this changing view of the self rather than to insist that responsibility requires an absence of change. The burden of the proof, it seems to us, stands on the side of those claiming that a mental modification *deriving from these drugs* constitutes a responsibility-undermining threat to authenticity. Simply pointing at the presence of a mental modification is not enough.

A further element of complication for the capacitarian approach derives from the ineliminable presence of normative elements in the capacity attribution. On the one hand, it seems that even accepting the idea of there being an important relationship between capacity and responsibility, this idea cannot not be read in the simple sense of there being a *direct ratio* between the two, such that at each modification in the capacity of the subject corresponds an equal modification of his responsibility. That this is not the case can be realized by looking at the *diminished* capacity side, for example in the legal working of the insanity defence. Put very roughly, people that fall above *a certain threshold* of capacity are *ceteris paribus fully* legally responsible for their deeds, no matter *how much* they are intelligent, rational, sensitive and so forth. So something similar might be true on the *enhancement* side. It could therefore be the case that the kind and/or quantity of mental modification allowed by cognitive enhancement turns out to be insufficient to modify the capacities in a way that is *relevant from the point of view of moral and legal responsibility*. This is another important specification that does not affect the validity of the capacitarian approach in itself. It only invites us to characterize it in a more precise way, in order to be able to apply it correctly to the present case (Vincent 2013).

A final challenge to the capacitarian approach derives from problems related to the very notion of 'capacity'. According to a certain view of capacity (Santoni de Sio and Jespersen 2013) roles are decisive not only for *setting the thresholds of morally or legally relevant capacities*, but for *defining and attributing* capacities in the first place. On this view, knowing the level of *performance* expected from a certain subject given his past performances or his material and psychological conditions in a given circumstance is not sufficient to determine his *capacities* at that moment. Being able to predict an agent's particular *behaviour* is something different from evaluating their *capacities*. To determine, for example, whether a certain person has the capacity to run 1 km in less than 5 min or to calculate the square root of 121 in a given circumstance, one must know what *kind* of runner or mathematician she is in the first place. Then one should determine the expected performance—in a *normatively-laden sense*—by people occupying *that role in those circumstances*. Only at this point will it be possible to determine whether a particular performance is one to be expected by that individual in those circumstances.

From this perspective, the general capacities of an agent are defined through the reasonable *normative expectations* entailed in the roles that she occupies in a given

circumstance. And the (legitimate) attribution of a certain role does not depend only on past performances and material conditions of the actual performance, but also on facts like the fulfilment of certain formal requirements (the existence of various social structures) and procedures (the recognition of one's position within those structures). Although this account of 'capacity' does not necessarily *undermine* the capacitarian idea that responsibility tracks capacity, it does nevertheless *complicate* it, since it posits a two-way relationship between capacity and responsibility. Not only does the scope and content of a given person's responsibilities hinge on their possession of particular capacities (defined according to a purely naturalistic criterion), but their possession of those capacities at a certain time is itself something that depends on what roles and responsibilities they have.

7.4 Psychological Inquiry

Psychology should use empirical methods to collect data on the attitudes and responsibility attributions of groups of two types: *valorisation groups* of surgeons, pilots and military personnel—professionals who might one day be expected to take cognitive enhancers—and the *general public*. The data gathered from both types of group will capture opinions on the responsibilities there might be for certain individuals *to* enhance and the degree to which enhanced individuals are responsible *for* their acts and omissions.

In relation to the valorisation groups, surveys are used to directly investigate the views of the professionals on the subject of enhancement within their respective professions. Samples of people from different professions (e.g., soldiers, surgeons, pilots) and different countries (e.g., Netherlands, UK, Australia) are asked for their opinions on the responsibility *to* enhance in their profession (first wave of surveys) and *if* enhanced (second wave of surveys). These surveys will invoke different senses of responsibility: for example, soldiers are asked about the extent to which they agree that 'responsible soldiers would take substances to improve their performance' ('virtue responsibility'), and extent to which they agree that 'soldiers who do not take substances that improve their performance are blameworthy' ('outcome responsibility/blame'). The data collected from these surveys has two main uses: (1) it provides ideas for normative analysis—views and opinions on responsibility may emerge that the philosophers had not yet considered (these views feed into the reflective equilibrium) and (2) it aids in the overall development of policy recommendations—it is crucial to understand the concrete contexts and the views of those within them to make *reasonable* and *efficacious* policy recommendations for these contexts.

Extending our data collection beyond members of the valorisation groups to assess the opinion of the general public, surveys and experiments are used to explore lay reasoning on both the responsibility *to* enhance and *if* enhanced. The same method as for the valorisation groups is employed: in surveys, participants are asked about their opinion on whether people from different professions (e.g.,

soldiers, surgeons, pilots) should enhance themselves (responsibility *to* enhance) and how they attribute responsibility *if* enhanced. Again, different senses of responsibility are covered. This way, the opinion of the valorisation groups can be compared to the opinion of lay people, allowing for a systematic comparison. Additionally, behavioural experiments are employed. Experiments involve manipulating one variable to determine if changes in this variable cause changes in another variable. This way, causal conclusions can be drawn. Hence, attributions of responsibility and the factors that influence these attributions can be assessed in detail. Participants' reasoning is addressed indirectly by presenting them with scenarios to assess. Different factors that might influence the attribution of responsibility in relation to enhancement are varied in these scenarios (e.g. outcome of action, how much is at stake). For example, a basic scenario describing a surgeon who has the opportunity to take modafinil before a challenging operation might vary whether participants are asked to imagine this surgeon to be themselves versus another person. This might alter the participants' opinion on whether they think the surgeon should take the enhancer.

This assessment of the reasoning of the 'average person' serves two functions: (1) it serves as a yardstick against which to test preliminary normative conclusions: if the philosophers posit responsibility concepts and a theory about their relationship to enhancement that turn out to *diverge* from lay intuition, then this divergence must be explored and explained: either the normative concepts and theory have to be revised or the lay intuitions have to be shown to be compatible through exposing biases or systematic differences in conceptual definitions. (2) The assessment of the 'average person' allows insight into the attributional biases that may be colouring the lay attributions, for example differences in judging your own versus the behaviour of another person, i.e., actor-observer asymmetries (e.g. Malle et al. 2007). These insights into such biases (cf. Caviola et al. 2014) are important for (a) providing a possible explanation for any divergence between the normative conclusions and lay attributions (hence removing the divergence as a challenge) and (b) predicting public responses to the policy approach normative conclusions suggest: the insights provide information that will help policymakers present and explain potentially controversial enhancement policy to the general public, especially if the 'average person' opinions are different from those of the members of the valorisation groups.

Whilst understanding the particular professional contexts involves asking the right people within that profession—people who will be best positioned to provide a useful perspective on what the implications of enhancement would be for surgery or aviation or military operations etc., understanding lay attributions of responsibility requires gathering data from as large and as representative a sample of the general population as possible. The data gathered from both types of group is crucial to the overall aims of reaching a coherent normative position on the concepts and conceptual relationships involved in cognitive enhancement debate, to situating this position constructively within the professional contexts where the debate is most relevant, and to generating policy recommendations for these contexts; policy which must be justified to the population at large.

7.4.1 Preliminary Findings

We gathered preliminary data from lay people that can shed light both on their opinions regarding a responsibility *to* enhance and their attributions regarding the responsibility *if* enhanced.

To obtain an initial impression of the attitudes lay people have about the use of cognitive enhancement substances by professionals in certain roles we asked the following question on a paper-and-pencil questionnaire: ‘Do you agree with the following statement? People in professions that affect the life and death of other people (e.g. surgeons) have a moral obligation to take substances that enable them to perform as well as possible.’ The answers were to be given on a 7-level rating scale ranging from 0 (‘completely disagree’) to 6 (‘completely agree’). 80 participants (81 % female, 19 % male; mean age 22; mostly University students) took part in that survey in a controlled laboratory setting. Results show that participants clearly reject the claim that there exists a moral duty to enhance in this context: 44 % responded ‘completely disagree’ and 18 % ‘disagree’ to the above statement. Only one participant agreed, and nobody agreed completely. Correspondingly, the overall mean value of all responses is 1.50 (with a standard deviation of 1.7), translating to ‘between completely disagree and disagree’. Results did not depend on participants’ demographical characteristics like sex and age. Hence, the lay intuition in our sample is clearly that there is no moral duty to take enhancement substances for certain professionals. This result is perhaps not surprising given the strong objection the general public has against the use of cognitive enhancement substances (e.g. Bell et al. 2013; for a review, see Schelle et al. 2014).

Obviously, in keeping with the principles motivating responsible innovation, research in this area must be sensitive to the possibility of attitude change, especially as the technology develops and public knowledge of its benefits and risks accumulates. Especially where psychoactive substances are concerned, we can usefully reflect on changes in attitudes over time. For example, attitudes towards caffeine have changed significantly: whilst Sweden now has one of the highest per capita rates of coffee consumption, in the 18th Century coffee consumption was disapproved of and even prohibited (Weinberg and Bealer 2001). At the present time, research tells us that people do not think about cognitive enhancers as comparable to caffeine. For example, although people take cognitive enhancers for reasons similar to those motivating ingestion of caffeine—often in pursuit of the psychoactive effects—people are disinclined to see them as analogous substances (Forlini and Racine 2012). This could be due to a lack of familiarity with the new cognitive enhancers and suspicion surrounding their effects and side-effects. Further, whilst drinking coffee has become a social activity, this is not the case for taking enhancers like methylphenidate and modafinil, the use of which might even bare some social costs for the few who take them (Faulmüller et al. 2013). Of course, familiarity with and attitudes towards enhancers may change over time, as might opinion on the appropriateness of their use in professional contexts. To

address the possibility of changing attitudes and values, the ongoing psychological research has to take account of factors that have been shown to determine how acceptable people find the use of cognitive enhancers (e.g. negative side-effects or fairness; Faber et al. 2015; Scheske and Schnall 2012), and to investigate whether attributions of responsibility change when participants are asked to envisage changes to these factors (e.g. availability of cognitive enhancers without considerable side-effects).

To obtain preliminary data on attributions related to the responsibility *if* enhanced, we conducted a first experiment with the student sample described above. In that experiment, participants were completing a performance task. Before they started the task, they were given a glass of juice to drink. Participants were told that this juice might contain certain enhancing substances like vitamins or caffeine. After the completion of the performance task, they were asked to rate their agreement to the following statements on a 7-level scale from 0 ('completely disagree') to 6 ('completely agree'): 'I am responsible for how I performed in the task' and 'The substances contained in the juice are responsible for how I performed in the task'. Overall, participants attributed significantly more responsibility for their performance to themselves than to the potential enhancer: The mean value for themselves is 4.8 (with a standard deviation of 1.1), which translates to 'agree' (with a tendency to 'somewhat agree'). The mean value for the substances is 1.0 (with a standard deviation of 1.0), which means 'disagree'. (Statistical significance of this difference between self versus substances was proven by a t-test, $t(79) = 20.33$, $p < 0.001$.) Interestingly, this pattern does not depend on participants' subjective performance: whether they thought they had done well or badly in the task had no influence on their attributing responsibility for the result to themselves, rather than to the substances they took. This suggests that they did not use the potential cognitive enhancer as an 'excuse' for bad performance.

Responsibility attributions for self versus substances are significantly negatively correlated ($r = -2.2$, $p = 0.027$): the more responsibility they ascribed to themselves, the less they attributed to the potential enhancer (and vice versa). These results were not affected by participants' age, sex, or what the juice they drank actually contained.

In sum, these results imply that in this context people seem to see themselves as responsible for the results of their actions, rather than a cognitive enhancer, and that this is independent of the subjective quality of this result. Moreover, there might be a tendency to distribute a certain fixed amount of subjective responsibility: the more people give themselves, the less an enhancer gets. However, there are reasons why these results should not be taken as more than preliminary indications about lay reasoning. First, this responsibility 'sub-experiment' was part of a larger experiment. Although statistical analyses imply they were not, we cannot rule out that our participants have been affected by the other treatments, e.g. in their ability to concentrate. More importantly, due to the experimental set-up participants were not sure which substances were actually contained in the juice they drank. Although what participants believed they took did not influence the results

reported above, results might be different for people who take a substance which they are convinced has an effect on their cognitive performance.

In sum, our first tentative empirical investigations imply that lay people seem not to see an obvious positive relationship between cognitive enhancement substances and responsibility: they do not think that people in certain professions have a moral duty to take such substances, nor do they attribute responsibility for their own performance to an ingested enhancer. Whether these tendencies remain stable, our further empirical investigations have to prove.

7.5 Legal Analysis

The legal analysis of the problem involves a degree of speculation: there are no recorded legal cases involving cognitive enhancers and the idea that professionals such as surgeons and pilots might someday have a legal obligation to take enhancers has been put forward only very recently and very tentatively. However, it is conceivable that, if cognitive enhancers were proven to be safe and effective for surgeons, pilots and other professionals for whom the costs of error are high, the general public may begin to expect these professionals to take them under some circumstances (for an extended discussion on the relation of safety, effectiveness and ethical debate, see Maslen et al. 2014). Where this expectation emerges, so too does the possibility of negligence claims in the event of a failure to enhance. Given this possibility, and the speed at which new pharmaceuticals are being developed and made available, preparatory analysis is needed to identify and examine the legal issues such claims would raise. This analysis is not only important for legal practice, but also for the professionals who could be affected by this practice.

To do this, the lawyers are examining the tort of negligence to consider how a court would assess a claim involving harm allegedly resulting from a professional's failure to take an enhancer. This involves looking at when the law ever imposes obligations on individuals to *do* certain things (i.e. makes them liable for *omissions*), how the standard of care is determined in different professions (and how the attendant expectations evolve), and how causation could be established in a case involving enhancer omission. The lawyers are also looking at any guidance from relevant councils—medical, aviation etc.—that could be used to support or challenge a claim that a professional was negligent in not taking an enhancer. Such guidance often constitutes 'soft law': not following it is not illegal per se but may have disciplinary consequences and can be used as evidence when establishing negligence in court. Finally, cases involving analogous features—for example, where an individual is required to remedy a deficiency in a capacity—are compared in an attempt to extrapolate key principles. Driving with certain medical conditions can generate such requirements.

7.5.1 Preliminary Findings

The legal research so far has focused on surgeons and their potential duties in relation to enhancement. In particular, it has focused on the modest claim that there could be some limited circumstances—where the surgeon is very fatigued and the only person available to perform the surgery—in which it might be thought that the surgeon has an obligation to take a cognitive enhancer (see Goold and Maslen 2014b). In general, English law is very reluctant to impose omissions liability. For example, it does not impose a duty of easy rescue: absent an established duty of care, a person walking past a drowning child is under no obligation to save the child, even if it would be very easy for the person to do so.¹ However, where there is a clear duty of care—as found between a surgeon and her patient—the individual owing the duty of care will be obligated to *do* certain things.

Negligence liability depends on five things being established: (1) that the defendant owed the claimant a duty of care, (2) that the defendant breached this duty of care, (3) that the claimant suffered some harm, (4) that this harm was caused by the defendant's breach, and (5) that the harm was not too remote. Of particular importance for our project is to ask whether a surgeon might ever be in breach of his *duty* by not taking a cognitive enhancer (2) and how it could be established that not taking an enhancer *caused* harm to the patient (4).²

In England and Wales, a surgeon breaches his duty if his acts or omissions fall below the minimum standard of care. In cases of alleged clinical negligence, the minimum standard of care is determined by what has become known as the 'Bolam test', arising from the judgment of McNair J in *Bolam v Friern Hospital Management Committee*.³ According to the test, a defendant 'is not guilty of negligence if he has acted in accordance with a practice accepted as proper by a responsible body of medical [persons] skilled in that particular art'.⁴ In the case of our fatigued surgeon, the question for the court would be whether it is standard practice to use enhancers in emergency situations such as when the surgeon is particularly fatigued but the only person able to perform the surgery. The answer at the present moment would obviously be that it is not: the use of cognitive enhancers is not mainstream practice and a body of medical persons who would testify to this could easily be found.

However, what is accepted as proper practice changes over time as new techniques and procedures are introduced. Further, subsequent to the decision in *Bolam* the court now has the authority to independently assess the *reasonableness*

¹Relatedly, see *Barrett v Ministry of Defence* [1995] 3 All ER 87 (CA); *Sutradhar v Natural Environment Research Council* [2006] UKHL 33; [2006] 4 All ER 490 (HL).

²The issues of duty and of causation are explored in depth in Goold and Maslen (2014b) and Goold and Maslen (2014a), respectively.

³*Bolam v Friern Hospital Management Committee* [1957] 1 W.L.R. 582.

⁴*Ibid.*, at 587.

of the way in which the surgeon acted. In *Bolitho v City and Hackney Health Authority*,⁵ the Court held that in determining the standard of care, that the Court must be ‘... satisfied that, in forming their views, the experts have directed their minds to the questions of comparative risks and benefits and have reached a defensible conclusion on the matter’. This supplements the assessment of prevalence of behaviour with an assessment of its reasonableness. Thus, even if there existed a body of medical people who stated that they would not use cognitive enhancers, if it became apparent that cognitive enhancers cheaply and effectively reduced risk, a judge would *be able* to (although would not necessarily) find the expert’s testimony indefensible. However, at the present time, concerns about the risks posed to the surgeon in requiring her to take medication for unapproved purposes, and the general reluctance of the law to intervene on people’s bodies make a legal duty to enhance very unlikely.

Despite the current conclusions it should be noted that professional requirements—along with public attitudes, noted above—do change over time, especially as new technologies emerge. Whilst courts are currently unlikely to invoke *Bolitho* to establish a duty for surgeons to enhance, there have been instances of technological change that did result in new duties. For example, American case law includes a couple of ‘landmark’ cases where medical professional defendants were held liable for their failure to adopt new technologies or procedures, even when near universal custom did not involve using them.⁶ In one case (*Helling v Carey*⁷), an ophthalmologist was held negligent for failing to perform a simple pressure test for glaucoma, which the claimant had developed. This judgment was reached despite expert testimony attesting to the fact that the standard practice in ophthalmology was to not require glaucoma tests for patients under the age of forty. In another case, (*Washington v Washington Hospital Center*⁸) a hospital was held liable for failing to use an oximetry monitor which, it was argued, would have provided early detection of the oxygen deprivation which ultimately lead to the claimant’s brain damage. This was despite expert testimony claiming that the use of these monitors was not yet widespread and not mandated. Thus, if empirical evidence repeatedly demonstrated the safety and effectiveness of enhancers, views on whether their use should be adopted as a simple precaution may change.

However, it must be remembered that medical practice is not only shaped by peer consensus on proper practice and legal assessments of corresponding negligence. Surgeons should also act in accordance with guidelines such as *Good Surgical Practice* (2008), published by The Royal College of Surgeons. Whilst not legally binding, deviation from these guidelines can at least be used as an argument that some particular way of proceeding was negligent. If cognitive enhancers

⁵*Bolitho v City and Hackney Health Authority* [1998] AC 232.

⁶The following two cases are cited in Greenburg (2009).

⁷*Helling v Carey* (519 P.2d 981 [Wash. 1974]).

⁸*Washington v. Washington Hospital Center*, 579 A.2d 177 (D.C. Cir 1990).

were ever to become a legal requirement for surgeons under some circumstances, it is more likely that this would be as a consequence of explicit statements in guidelines rather a revolutionary court decision.

If there ever were to be a duty for surgeons to take enhancers, in cases where a breach of this duty was established, the court would also have establish that, it was this breach that *caused* the claimant's harm (see Goold and Maslen 2014a). Despite the 'balance of probabilities' standard of proof, establishing causation can be notoriously difficult, particularly when there are multiple competing causes. The standard test of causation—known as the 'but for' test—would involve an assessment of the likelihood that if the surgeon had taken the enhancer, the harm would not have occurred. If it is more likely than not that taking the enhancer would have prevented the harm, then the surgeon may be held liable. However, the effects of not taking an enhancer—essentially, allowing fatigue to persist—are not easy to identify. Whereas, for example, not giving a patient enough oxygen has clear and measurable effects, the specific effects on the patient of a surgeon operating whilst fatigued are indeterminate. Further, there are always inherent risks involved in surgery, which are often blameless if they materialize. It would be very difficult to know whether or not some instances of harm are risks that materialized blamelessly or were consequences of the fatigue that the surgeon omitted to remedy. Much will depend on the precise details of the case: the particular procedure that took place, the level of cognitive and manual dexterity involved, the risks inherent to the procedure, the probability that these risks materialize, and so on.

The legal analysis has compared hypothetical 'fatigued surgeon' cases with various landmark cases in negligence law to draw out similarities and differences in causal structures. This analysis has identified the causal structures most likely to be in operation in potential fatigued surgeon cases. However, it remains questionable whether the court could sufficiently overcome the uncertainty arising from the indeterminacy of the effects of fatigue, and the fact that some harms will have been risks identified as inherent to the surgical procedure.

7.6 Conclusions and Future Research

As has emerged, the philosophical thesis of capacitarianism faces some *prima facie* challenges generated by the psychological and legal findings. The preliminary psychological data suggests that, *at present*, lay people do not seem to see an obvious positive relationship between cognitive enhancement substances and responsibility: they do not think that people in certain professions have a moral duty to take such substances, nor do they attribute responsibility for their own performance to an ingested enhancer. However, as emphasized, the method of reflective equilibrium *anticipates* conceptual and normative disagreement, aiming to reach coherence once all the normative commitments and empirical facts have been considered. Further psychological research will help confirm whether the survey and experimental instruments indeed tap into the postulated concepts

and whether any attributional biases are in operation. In the event that the intuitions of lay people do substantively diverge from the tenets of capacitarianism, the philosophers will be able to explore why and reflect on the consequences of this for their theory.

The legal analysis has so far suggested that intuitions about a moral obligation for some professionals to take enhancers may not translate organically into a legal duty in the foreseeable future. Negligence law in England and Wales still tends to use an evaluation of consensus to determine the duties of the clinical practitioner and, unless a decision to issue explicit guidance were made, a potential claimant would be hard-pressed to provide evidence that a surgeon had breached her duty of care by not taking an enhancer. Even if a duty were to be identified, the difficulty involved in proving that the failure to take the enhancer caused the particular harm (even on the balance of probabilities) would generate a significant challenge to the imposition of liability.

However, even if professionals like surgeons were never to be held liable for not taking enhancers, this does not mean that the capacitarian thesis must be abandoned. Capacitarianism principally makes claims about the responsibilities of people *once* enhanced. It also does not speak against the possibility of a *moral* duty to take enhancers if they are proven to be safe and effective. We are not legally required to do all that is morally required of us. Further, the evidential difficulties that would accompany attempts to establish causation might preclude holding people liable even if changes to common practice were one day to weigh in favour of a clinical duty to enhance. Philosophical theses about the relationship between capacities and responsibility, and about what we are morally required to do—whilst benefiting from knowledge of empirical realities, such as what cognitive enhancers do—do not have to make pragmatic decisions about liability based on limited information.

Where emerging technologies are seen to promise great social benefits, research is needed at the early stages of innovation to assess risks and opportunities (current and future), and to identify the likely social and ethical implications of these risks and opportunities. Ideally, we have argued, such research should engage with groups in society who could be affected by or benefit from the particular emerging technology. In the spirit of responsible innovation, research into the effects and implications of these technologies should be sensitive to the evolving landscape of public attitudes and professional duties, whilst providing detailed analysis of the current state of affairs for immediate policymaking.

Cognitive enhancement drugs such as methylphenidate and modafinil have received attention from ethicists and philosophers but, to date, little research has focused on the concrete opportunities cognitive enhancement presents for particular groups in society. Our research has begun to redress this by examining normative hypotheses alongside psychological data and legal precedent, ultimately aiming to make recommendations for policy and the professionals within its remit.

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