

# MUST THE SURGEON TAKE THE PILL? NEGLIGENCE DUTY IN THE CONTEXT OF COGNITIVE ENHANCEMENT

**Imogen Goold and Hannah Maslen**

## **Abstract**

Recently, attention has turned to the possibility of enhancing human cognitive abilities via pharmacological interventions. Known as ‘cognitive enhancers’, these drugs can alter human mental capacities, and in some cases can effect significant improvements. One prime example is modafinil, a drug used to treat narcolepsy, which can help combat decreases in wakefulness and cognitive capacity that arise due to fatigue in otherwise healthy individuals. In this paper, we respond to calls in the philosophical and ethical literature that surgeons and other medical professionals should be morally obliged to take cognitively enhancing drugs. We examine whether surgeons who make fatigue-related errors during patient care might be considered *legally* obliged to enhance themselves. We focus on liability for a failure to medicate, and conclude that it is highly unlikely that surgeons will be legally obliged to address their fatigue through the use of cognitive enhancing drugs.

## **Keywords**

Negligence, omissions, cognitive enhancement, medical, modafinil, surgeon

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# MUST THE SURGEON TAKE THE PILL? NEGLIGENCE DUTY IN THE CONTEXT OF COGNITIVE ENHANCEMENT

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A

## Introduction

Human beings attempt to enhance their capacities in many ways. They train their bodies through physical exercise and they develop their minds through reading and study. In many professions, such training is a prerequisite for employment. For example, surgeons must complete at least nine years of study and demonstrate proficiency in a wide range of required competencies before they may legally practice. Surgeons emerge from their training able to perform tasks that were previously unable to perform—they have enhanced their capacities.

Recently, attention has turned to another form of capacity enhancement—the improvement of cognitive abilities via pharmacological interventions. Known as ‘cognitive enhancers’, these drugs can alter human mental capacities, and in some cases can effect significant improvements. Two drugs in particular have garnered interest for their potential as cognitive enhancers: Ritalin and modafinil. Both are increasingly being used by people who hope to experience positive impacts on cognitive effectiveness and efficiency and in some cases this use is occurring in a professional context.

To date, the discussion of cognitive enhancers has occurred mostly within the philosophical and ethical literature. Considerable attention has been paid to questions pertaining to the ‘fairness’ of their use<sup>2</sup> and whether the cognitive life that enhancers

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<sup>2</sup> See, eg, J. Savulescu, ‘Justice, Fairness, and Enhancement’ (2006) 1098 *Annals of the New York  
Academy of Sciences* 321.

precipitate is ‘authentic’.<sup>3</sup> Of more significance from a legal perspective is the emerging view that certain professionals might be morally *obliged* to take cognitive enhancers. This view is taken seriously by policy-orientated working groups, by legal scholars and even by some of the professionals themselves.

This view can be seen in a recent report on human enhancement and the future of work, produced by the Royal Society, Academy of Medical Sciences, British Academy, the Royal Academy of Engineering and the Royal Society, commented that:

[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.<sup>4</sup>

Similarly, the editors of *Mayo Clinic Proceedings*, both medical doctors, have argued that there are conditions under which resident physicians have an ethical duty to take a stimulant like modafinil to reduce errors:

What if a legal stimulant that is shown to be safe could be used to improve medical care during periods of fatigue, regardless of the number of hours worked? Would not the more ethical choice be to promote the reduction of errors—First, do no harm?<sup>5</sup>

Writing in the *Journal of Surgical Research*, surgeons have also suggested that the prospect of themselves and their colleagues having to take enhancers is not far-fetched and may come to be required practice. They say:

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<sup>3</sup> I. Singh, ‘Will the “Real Boy” Please Behave: Dosing Dilemmas for Parents of Boys with ADHD’ (2005) 5 *The American Journal of Bioethics* 34.

<sup>4</sup> The Academy of Medical Sciences and others, *Human Enhancement and the Future of Work* (Report from a Joint Workshop, November 2012), at 38, available at <http://www.acmedsci.ac.uk/p47prid102.html#downloads> (last visited 22 May 2013) (citation omitted).

<sup>5</sup> S. H. Rose and T. B. Curry, ‘Fatigue, Countermeasures, and Performance Enhancement in Resident Physicians’ (2009) 84(11) *Mayo Clinic Proceedings* 955. There is increasing support for enhancement in other areas in the ethics literature. See, eg, J. Harris and A. Chatterjee, ‘Is it Acceptable for People to Take Methylphenidate to Enhance Performance?’ (2009) 338 *British Medical Journal* 1532, 1533: arguing that it is ‘not rational to be against human enhancement’.

The prospect of fatigued surgeons taking a prescription drug, such as modafinil, to allow them to operate for longer, and possibly to a higher standard, is perhaps not as far-fetched as some may suggest. This drug has already been trialled in emergency physicians, when performing non-medical-related tasks at the end of a nightshift.<sup>6</sup>

They also emphasise that the concept of surgeons risking their health to benefit patients is not an alien one. They cite operating on patients with blood-borne transmissible diseases as an example of where the risk to the surgeon is felt justifiable to improve the patients' chances of recovery. Having noted that there are 'useful and warranted forms of coercion' forcing surgeons to undertake practices such as hand washing and sterility prior to and during surgery, they ask:

What will our employers feel about a drug that makes us less prone to error, able to work longer hours, or to operate more efficiently? Employers are able to request certain behavioral standards from their employees, dictate rest periods, and insist on abstinence from certain drugs to ensure that their doctors perform well—will a day arise where they can recommend or even insist on surgeons' being artificially enhanced? This may seem fanciful, but recent work has suggested that a mixture of napping and caffeine attenuates fatigue in interns and thus should be adopted by hospital administration. Why not other types of stimulant?<sup>7</sup>

Whether such insistence will be legally enforceable is a question that has also received a tentative 'yes' from legal scholarship. Chandler has argued that the law might indirectly require surgeons to enhance following changes to what is viewed as delivering reasonable care.<sup>8</sup> She suggests that these changes could have the effect that a surgeon's failure to adopt novel neurotherapies that remedy cognitive limitations would be negligent if it could be shown to have led to harm. She emphasises the indirect way in which this could occur:

Cognitive deficits may also raise the risk of liability if they cause a physician to make errors that would not be made by the reasonably prudent practitioner in the field, or to fail to keep up with developments in the field to an extent that is considered to fall below the reasonable standard of

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<sup>6</sup> O. J. Warren, D. R. Leff, T. Athanasiou, C. Kennard and A. Darzi, 'The neurocognitive enhancement of surgeons: an ethical perspective' (2009) 152(1) *Journal of Surgical Research* 167, at 168.

<sup>7</sup> *Ibid*, at 171.

<sup>8</sup> J. A. Chandler, 'Autonomy and the Unintended Legal Consequences of Emerging Neurotherapies' (2013) 6(2) *Neuroethics* 249.

care in the profession. In such cases, the courts would simply find there had been a failure to maintain the standard, without necessarily commenting on cognitive deficits or therapeutic methods to alleviate them.<sup>9</sup>

Given that the routine use of enhancers by professionals is seen as a real possibility, and potentially even a future requirement, legal analysis needs to examine what implications this will have. As the professional use of enhancers becomes more prevalent and expected, the potential for legal claims emerges. In our view, the most likely contexts in which legal claims involving enhancers may arise are clinical practice and driving. Thus, and in this paper, we focus on potential claims of negligence, and specifically whether a duty of care could require someone to take a cognitive enhancer. We do so in part because at present the most widely used cognitive enhancing pharmaceuticals can be used to combat decreases in wakefulness and cognitive capacity that arise due to fatigue. Where the injured parties allege that their injury occurred due to the driver or surgeon's fatigue, the argument that a fatigue-related error resulting in harm could have been avoided by taking an enhancer might be appealing when targeting a tired surgeon or professional driver.<sup>10</sup> This will be increasingly conceivable as knowledge and availability of these enhancers grows, especially if there are suggestions that medical professionals are morally obliged to self-medicate in this way. We focus our discussion on the possible use of enhancers by a group of professionals for whom their use might be especially attractive—surgeons—and examine questions of liability through the example of a fatigued surgeon.<sup>11</sup> However, the majority of our conclusions about obligations in this context could be extrapolated to other situations in which a fatigue-related error has occurred. We focus our discussion around the use of modafinil, as there is growing evidence of its efficacy in addressing fatigue.

In claims of negligence involving cognitive enhancement, two main claims might be made: that harm occurred as the result of a person having taken an enhancer; or that a

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<sup>9</sup> *Ibid.*, at 256.

<sup>10</sup> Analogies can be drawn with cases of diabetics failing to medicate appropriately before driving.

<sup>11</sup> We have chosen surgeons in part because they are a professional group more likely to possess knowledge of, and be able to gain access to, cognitive enhancing pharmaceuticals. They have also been the target of calls for a professional obligation to take enhancing drugs. However, much of our discussion will apply to other professions for whom cognitive enhancement might arguably be beneficial, such as pilots and the military.

person could have avoided causing harm by having taken an enhancer. The first claim would be a relatively straightforward question of whether the act of taking an enhancer fell outside the ambit of what a reasonable, fatigued, surgeon would do, albeit a question fraught with issues of policy. In this paper, we examine the more difficult, latter situation—the claim that a professional ought to have taken a cognitive enhancer, and in failing to do so, should be held liable for the harm that resulted from that failure. We do so in part as a response to calls for recognising a moral duty for surgeons to self-enhance, and because determining how the law would (and should) approach such claims is far from clear and hence demands exploration prior to any such claims arising.

We note that both claims would also face significant causation barriers, but do not examine these here, instead focusing on the fundamental prior question of whether a duty to take such an enhancer would, or could, arise in negligence.<sup>12</sup> We acknowledge, of course, that if it is impossible to establish causation, this precludes findings of liability. It might be thought that this renders the question of duty redundant. However, we do not think this is the case. First, whether one thing caused another is an empirical question which can in some cases can be very difficult or even impossible to answer. Whether there is a duty or not, however, is a normative question about what one *should* do. The conclusion that there is no duty to enhance is importantly different from the conclusion that there is a duty but that no individual will ever be held liable for breaching it due to epistemic limitations. Second, the separate analysis of duty is important because it has implications for practice. As demonstrated above, various commentators, including surgeons, are of the view that there might be a duty to take cognitive enhancers. Legal analysis that explained why there was no legal duty would offer a more satisfactory counter to this view than analysis that explained that whether or not there is a duty is inconsequential because no one could prove that not enhancing resulted in harm. Practitioners who may be conflating prudential, moral or legal motivations to enhance will be able to better understand why the law, at least, would not hold them liable for omitting to enhance, *even if* the causal ramifications were perfectly determinable. Third, given that other legal scholars have suggested that

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<sup>12</sup> We will explore these concerns in a forthcoming paper: H. Maslen and I. Goold, ‘Obliging Surgeons to Enhance: Negligence Liability for Uncorrected Fatigue and the Problem of Causation’.

the law will indirectly oblige surgeons to enhance – in essence that there could be a duty – this claim requires further analysis and consideration to elucidate the nature of this potential duty and its plausibility.

## B Paper structure

We examine the possibility of liability by first explaining what cognitive enhancers are and how they might be used. We then present a scenario of a fatigued surgeon who contemplates using modafinil to combat her tiredness during surgery. Following a brief explanation of the relevant principles of medical negligence, we apply these to two versions of the scenario and draw some preliminary conclusions about possible liability. The concluding section of the paper presents four arguments to support our contention that it is highly unlikely that the English courts will find a surgeon to be obliged to take a cognitive enhancer. We look to what might be expected of a surgeon who has assumed responsibility for a patient's care, and argue that such a duty would not extend to include an obligation to self-medicate with a cognitive enhancer. We draw this conclusion in part because the safety of such enhancers remains uncertain. This, combined with added uncertainty about how predictably efficacious these drugs are, suggests that the courts would be unlikely to require a surgeon to assume the risk that the enhancer might be harming to her when the benefits to the patient are far from clear. Indeed, the law's resistance to *obliging* anyone to risk his or her safety solely for the benefit of another person speaks against the courts requiring a surgeon to take a relatively untested drug solely for the benefit of another. Following cases such as *St George's Healthcare NHS Trust v S*, the common law's commitment to protecting individual bodily integrity bolsters the view that it is extremely unlikely that a court would find a surgeon negligent for failing to ingest a medication for another's benefit.<sup>13</sup> Finally, we explore some analogous cases relating to self-medication and impairment. There are very few closely analogous cases, but in those relating to failure to medicate and resultant harm to others, the wrong is generally framed as a negligent *act* (such as driving) while unmedicated, rather than as a failure to medicate. We contend that the same approach would be taken to our hypothetical surgeon who does not take an enhancer. We further contend that where she has no option but to

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<sup>13</sup> *St George's Healthcare NHS Trust v S* [1998] 3 WLR 936.

undertake surgery while dangerously tired, or to take the enhancer, that these cases are no longer analogous and other rules, such as those relating to a doctor's standard of care and rules around rescue/triage situations, would apply. In our view, neither area of law would place an obligation on the surgeon to take the pill.

## **B What are cognitive enhancers and how might they be used?**

The term 'cognitive enhancement' can be used in reference to a range of interventions, which have assorted effects on a variety of cognitive capacities. Although interventions such as education and computers have plausibly been argued to constitute mechanisms through which cognitive capacities are improved,<sup>14</sup> we focus on psychopharmacological substances as the prototypical example of cognitive enhancers. We do so because the short-term taking of a pill to cause direct, fairly immediate changes to cognitive capacity is not an area of potential liability with which the law has dealt, but it will need to if such pharmaceuticals continue to find increasing use as enhancers.<sup>15</sup>

What makes an effect an 'enhancement' is open to debate. The broadest conception of enhancement would extend to any kind of 'improvement'. More restrictive conceptions will differ depending on whether an objective or subjective perspective is taken: does the effect have to be considered an improvement according to some objective set of criteria, or is it enough that the individual experiences the effect as an improvement? Conceptions of enhancement further differ depending on whether the improvement only need return capacities to a normal level where they have been impaired, or must lift them above the norm. Conceptions will then differ on whether this is the individual's own norm or the norm for a particular set of people.

In this paper a broad understanding of enhancement is taken, allowing for improvements to cognitive functioning that bring a person back to her usual level of

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<sup>14</sup> N. Bostrom and A. Sandberg, 'Cognitive Enhancement: Methods, Ethics, Regulatory Challenges' (2009) 15 *Science and Engineering Ethics* 311.

<sup>15</sup> By comparison, the common law has already determined how it will deal with instances of negligence resulting from lack of appropriate training or skills (which are obtained via other, arguably 'enhancing' means such as education). In general, where fulfilment of a duty requires a certain degree of skill, knowledge or experience, the defendant's lack of these will not be a defence. See, eg, *Nettleship v Weston* [1971] 2 QB 691 (CA) (learner drivers); *Wilsher v Essex Area Health Authority* [1987] 2 WLR 425 (CA) (inexperienced doctors).



performance, as well as those that lift capacities above what is usual. The cognitive capacities that might be enhanced by pharmaceutical intervention include memory, focus, alertness, multi-tasking and mood. In line with our broad conception of enhancement, the exact effects might vary.<sup>16</sup> In this paper, we focus on the use of enhancers to return someone to her to normal levels of wakefulness and alertness, following an unusually short night of sleep, or following an unusually long working day. We do so because our focus is on the most likely situations in which a claim might be brought, primarily those in which the surgeon with the professionally expected level of capacity and competence has lost capacity due to fatigue and could (arguably) have regained her usual level of functioning had she taken the enhancer. We are not here concerned with ‘enhanced’ standards for those who take enhancers to lift their capacity above the general or even professional average, because at present the law is generally not concerned with such ‘enhanced’ standards except insofar as a member of a profession is expected to have gained required skills through training. We also focus on restoring wakefulness because this is one of the widely demonstrated effects of some cognitive enhancers, as the following research demonstrates.

One of the two major pharmaceuticals being used off-label as a cognitive enhancer is called ‘modafinil’. Modafinil (trade name ‘Provigil’ in the UK) is an analeptic medication that combats fatigue and promotes attention and concentration. It is used primarily to treat narcolepsy (excessive sleepiness and sleep attacks at inappropriate times), shift work sleep disorder and daytime fatigue resulting from sleep apnoea. One study demonstrated that modafinil significantly improved visual attention, reactions times and psychomotor speed in sleep-deprived participants, while another presented evidence that modafinil could reverse the cognitive disruptions experienced during night shift work.<sup>17</sup> Modafinil has been shown to be effective in reversing the

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<sup>16</sup> We might imagine a pharmaceutical intervention that increases a person’s capacities beyond their usual level. This might consist in enabling her to stay alert and focused for *longer* than she is usually able to, following a normal full night of sleep. Alternatively, the effect might be to make her *more* alert and focused but for the usual amount of time, under the same conditions. The third possibility is that she is made *more* alert and focused and for *longer* than she is usually able, under the same conditions. Alternatively, we might imagine that, under different conditions, this pharmaceutical might enhance – or restore – the person’s diminished capacities, which have been reduced due to a non-medical factor.

<sup>17</sup> S. Grady, D. Aeschbach, K.P. Wright Jr and C.A. Czeisler, ‘Effect of Modafinil on Impairments in Neurobehavioral Performance and Learning Associated with Extended Wakefulness and Circadian

adverse effects of fatigue on cognitive performance in pilots and military personnel.<sup>18</sup> Importantly, a study from 2012 found that within a group of sleep-deprived doctors, those who took modafinil performed better in tasks involving working memory and planning, made less impulsive decisions and were more able to flexibly redirect their attention.<sup>19</sup>

Modafinil is reportedly used to allow longer working, greater concentration while studying, and to address the effects of jetlag. The off-label use of modafinil is not confined to private individuals: the United States Air Force has approved the use of modafinil for pilots involved in certain aviation operations.<sup>20</sup> When used by individuals who do not suffer from a sleep disorder, it has the effect of increasing concentration and suppressing the need for sleep.<sup>21</sup> There is also evidence to suggest that modafinil may enhance some aspects of cognitive functioning, including reaction time, planning and task completion (although with higher rates of error). There is, however, some dispute over these effects, and some studies also show little impact of modafinil on other important aspects of cognitive ability such as attention shifting and many aspects of memory. Consequently the evidence of modafinil's impact on healthy individuals remains ambivalent.<sup>22</sup>

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Misalignment' (2010) 35 *Neuropsychopharmacology* 1910; C.L. Hart, M. Haney, S.K. Vosburg, S.D. Comer, E. Gunderson and R.W. Foltin, 'Modafinil Attenuates Disruptions in Cognitive Performance During Simulated Night-Shift Work' (2006) 31 *Neuropsychopharmacology*, 1526.

<sup>18</sup> J.A. Caldwell, 'Dextroamphetamine and Modafinil are Effective Countermeasures for Fatigue in the Operational Environment' (2005) *US Air Force Research Laboratory*, at <http://ftp.rta.nato.int/Public/PubFullText/RTO/MP/RTO-MP-HFM-124/MP-HFM-124-31.pdf> (last visited 22 May 2013); J.V. Baranski, V. Gill, T.M. McLellan, D. Moroz, A. Buguet and M. Radomski, 'Effects of Modafinil on Cognitive Performance During 40 Hr of Sleep Deprivation in a Warm Environment' (2002) 14(1) *Military Psychology* 23.

<sup>19</sup> C. Sugden, C.R. Housden, R. Aggarwal and B. Sahakian, 'Effect of Pharmacological Enhancement on the Cognitive and Clinical Psychomotor Performance of Sleep-Deprived Doctors: A Randomized Controlled Trial' (2012) 255(2) *Annals of Surgery* 222.

<sup>20</sup> See J.A. Caldwell and J.L. Caldwell, 'Fatigue in Military Aviation: An Overview of US Military-approved Pharmacological Countermeasures' (2005) 76 *Aviation, Space, and Environmental Medicine* C39.

<sup>21</sup> For a discussion of off-label use of modafinil, see B. Vastag, 'Poised to Challenge Need for Sleep, "Wakefulness Enhancer" Rouses Concerns' (2004) 291 *Journal of the American Medical Association* 167. For the results of a survey exploring off-label use of both methylphenidate and modafinil see B. Maher, 'Poll Results: Look Who's Doping' (2008) 452 *Nature* 674.

<sup>22</sup> See variously G. Lynch, L.C. Palmer and C.M. Gall, 'The Likelihood of Cognitive Enhancement' (2011) 99(2) *Pharmacology Biochemistry and Behaviour* 116; D.C. Turner, T.W. Robbins, L. Clark, A.R. Aron and J. Dowson, 'Cognitive Enhancing Effects of Modafinil in Healthy Volunteers' (2003) 165 *Psychopharmacology* 260; S.E. Winder-Rhodes, S.R. Chamberlain, M.I. Idris, T.W. Robbins, B.J.

The second medication being used for off-label enhancing purposes is methylphenidate, more commonly known by its trade name 'Ritalin'. Ritalin is most commonly prescribed to treat the symptoms of Attention-Deficit Hyperactivity Disorder (ADHD). Like modafinil, it increases capacity to focus and concentrate. Increasing evidence is emerging that Ritalin is being used off-label by healthy students in schools and colleges, particularly in the United States, to improve their ability to focus on academic work.<sup>23</sup>

Having described the effects of two of the main cognitive enhancers that can be used to increase wakefulness and concentration, we turn now to our scenario, in which a tired surgeon is faced with the difficult choice of whether to enhance herself using modafinil or not.

#### A **The scenario**

A fatigued surgeon has worked 36 hours without rest and is on her way home, when an emergency case arrives. She is the only available surgeon qualified to perform the surgery, as the other surgeon employed at the hospital who could perform it is suffering from serious food poisoning. She knows she is exhausted, but she believes she will probably remain sufficiently capable for the duration of the surgery required, which she expects to be about two hours in length, but that there is a risk that she might make an error due to her fatigued state. She also knows that the only alternative is for the patient to be diverted to the nearest other hospital, which is more than an hour's drive away. She is aware that in that hour the patient's condition will deteriorate considerably, and there is the possibility that he will suffer harm as a result. Faced with the choice to either perform the surgery or refuse, the surgeon decides to

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Sahakian and U. Müller 'Effects of Modafinil and Prazosin on Cognitive and Physiological Functions in Healthy Volunteers' (2010) 24 *Journal of Psychopharmacology* 1649; D.C. Randall, N.L. Fleck, J.M. Shneerson and S.E. File, 'The Cognitive-Enhancing Properties of Modafinil are Limited in Non-Sleep-Deprived Middle-Aged Volunteers' (2004) 77(3) *Pharmacology Biochemistry and Behaviour* 547; U. Müller, J.B. Rowe, T. Rittman, C. Lewis, T.W. Robbins and B.J. Sahakian, 'Effects of Modafinil on Non-Verbal Cognition, Task Enjoyment and Creative Thinking in Healthy Volunteers' (2013) 64 *Neuropharmacology* 490.

<sup>23</sup> See, eg, S.E. McCabe, C.J. Teter and C.J. Boyd, 'The Use, Misuse and Diversion of Prescription Stimulants Among Middle and High School Students' (2004) 39 *Substance Use and Misuse* 1095; S.E. McCabe, J.R. Knight, C.J. Teter and H. Wechsler, 'Non-Medical use of Prescription Stimulants Among US College Students: Prevalence and Correlates from a National Survey' (2005) 100(1) *Addiction* 96.

perform it. Then she remembers something. She has recently been taking a new kind of medication recommended by a colleague: modafinil. She has found that it makes her more alert when tired, and enables her to concentrate better on complex tasks. As she prepares for surgery, she remembers that she has some pills left in a bottle in her coat. Now a third choice presents itself. She could ask a nurse to get the pills for her, and take them to counteract her fatigue so that she can better perform the surgery. Is she under a duty to take them? And if she does not and she then makes a fatigue-related error that harms the patient, has she breached her duty towards him?

#### A **Negligence and the scope of the surgeon's duty of care**

We are focusing on the hypothetical situation in which a person chooses not to take an enhancer and a harm results that could have been avoided if she had taken it. In such a case, assuming actionable damage could be demonstrated, the court would have to establish whether the non-taking was a breach of duty of care. That is, the court would have to decide whether the defendant could be liable for *omitting* to take the enhancer, or put another way, was *under a duty* to take the enhancer. The court would then have to consider issues of causation and remoteness but we are not concerned with those in this paper.

Generally, English law will not find a person liable in negligence simply for omitting to act. As Lord Goff noted in *Smith v Littlewoods*, 'the common law does not impose liability for pure omissions'.<sup>24</sup> However, in the context of a surgeon's decisions about how to care for a patient, a failure to act is not a pure omission. In agreeing to take on the care of a patient, the surgeon becomes obliged to act as she has voluntarily assumed responsibility for that patient. She can then be held liable for a failure to act if this omission constitutes a breach of that duty.

The doctor assumes this responsibility as soon as she attends to the patient in her professional capacity, although it can arise when the patient is accepted for treatment at a hospital. In the case of surgeons, the assumption occurs at the moment they agree to treat the patient, and from this point onwards the surgeon must act in accordance

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<sup>24</sup> *Smith v Littlewoods* [1987] AC 241, 271 (HL). See also *Stovin v Wise* [1996] AC 923, 943–944 (HL), (Lord Hoffman).

with the accepted practices of a responsible body of medical practitioners.<sup>25</sup> The special relationship that arises places on surgeons the duty to *do* (and refrain from doing) particular things to protect their patients' interests.<sup>26</sup> This encompasses a duty not to exacerbate the situation, but the defendant will generally not be liable if the claimant is left no worse off than he would otherwise have been.<sup>27</sup>

The surgeon's employing hospital will also assume a primary duty to provide competent staff and proper facilities.<sup>28</sup> It is however now unlikely that the hospital also has a non-delegable duty to ensure that a patient received careful treatment.<sup>29</sup> The hospital's duties arise at the point of admission of the patient. The existence or otherwise of a non-delegable duty of care is largely irrelevant, however, as the hospital will be vicariously liable for the surgeon's negligence.<sup>30</sup> All this said, it should be noted that aside from situations in which a hospital or practice holds itself as offering emergency services, a doctor is not obliged to accept a patient.<sup>31</sup> If she, or the hospital, refuses to accept the patient, then no duty will arise.<sup>32</sup>

What must a surgeon do to fulfil her duty of care towards a patient for whom she has assumed responsibility? In cases of alleged clinical negligence, the minimum standard of care is determined by what has become known as the '*Bolam* test', arising from

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<sup>25</sup> *Bolam v Friern Hospital Management Committee* [1957] 1 WLR 582,121 (QB).

<sup>26</sup> See further E. Jackson, *Medical Law: Text, Cases and Materials* (Oxford: Oxford University Press, 2nd edn, 2010), 103-104. It is worth noting that outside a usual medical context (such as the doctor responding to calls for assistance on an aeroplane), the doctor will probably be expected to meet the standard of care of a reasonable, competent doctor but there are statements *obiter* that she might be held only to the lower standard of not making things worse: see *Capital & Counties plc v Hampshire County Council*, [1997] QB 1004, 1035 (Stuart Smith LJ).

<sup>27</sup> *East Suffolk Rivers Catchment Board v Kent* [1941] AC 74 (HL).

<sup>28</sup> The hospital's duty probably extends to providing properly skilled medical staff and an adequately equipped hospital. See *Bull v Devon AHA* [1993] 4 Med LR 117 (CA); *Wilsher v Essex Area Health Authority*, n 15 above; *Re R (a minor) (No. 2)* (1997) 33 BMLR 178 (CA).

<sup>29</sup> See *A (A Child) v Ministry of Defence* [2004] 3 WLR 469 (CA).

<sup>30</sup> The vicarious liability of hospitals for the surgeons they employ is well-established and broad in scope: *Godden v Kent and Medway Strategic Health Authority* [2004] EWHC 1629; Lloyd's Rep Med 521 (QB).

<sup>31</sup> Those organisations holding themselves out as offering emergency services are expected respond to calls for assistance or treatment: *Kent v Griffiths (No 3)* [2000] 2 WLR 1158 (CA), although note also relation to what that duty might entail: *Barnett v Chelsea and Kensington Hospital Management Committee* [1968] 2 WLR 422 (QB) in which it was said that the duty officer in a casualty department is not always obliged to see people who present for treatment, but must have a good reason for not doing so and should at least assess them.

<sup>32</sup> Hence hospitals often display notices that they do not accept accident and emergency patients.

McNair J direction to the jury in *Bolam v Friern Hospital Management Committee*.<sup>33</sup> 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’.<sup>34</sup> In the case of our fatigued surgeon, the question for the court would be whether it is standard practice to use enhancers in situations such as the one we constructed above. 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.

Since 1998, the *Bolam* test has been subject to what is often called the ‘*Bolitho* gloss’. Following *Bolitho v City and Hackney Health Authority* the assessment of the standard of care is no longer determined solely by a body of medical practitioners, and the court must now 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’.<sup>35</sup> Following *Bolitho*, the defendant’s actions will not be excused merely on the basis of the support of her peers if they lacked a logical or reasonable basis. 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 (but would not necessarily have to) find the expert’s testimony that cognitive enhancers cheaply and effectively reduced risk indefensible. In Mulheron’s words, ‘if the risk of an adverse outcome for the patient could have been easily and inexpensively avoided by an alternative course of medical treatment or diagnosis, then the doctor’s conduct will be held to be negligent, even if a body of medical opinion did endorse that conduct’.<sup>36</sup> This is a general point about risk-benefit analysis and the *Bolitho* approach, but we argue that its logic could be applied in the specific case of enhancers if they become sufficiently safe and effective.

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<sup>33</sup> *Bolam v Friern Hospital Management Committee*, n 25 above.

<sup>34</sup> *ibid*, 587 (McNair J).

<sup>35</sup> *Bolitho v City and Hackney Health Authority* [1998] AC 232, 242 (HL) (Lord Browne-Wilkinson).

<sup>36</sup> R. Mulheron, ‘Trumping Bolam: A Critical Legal Analysis of Bolitho’s ‘Gloss’’ (2010) 69(3) *Cambridge Law Journal* 609, 620.

Further, in *French v Thames Valley Strategic Health Authority*, Beatson J remarked that *Bolitho*'s 'gloss' was more likely to be activated 'where a case does not involve difficult or uncertain questions of medical treatment or complex, scientific or highly technical matters, but turns on failure to take a simple precaution the need for which is obvious to the ordinary person considering the matter'.<sup>37</sup> The need to avoid or eliminate tiredness as much as possible in those performing surgery is something that 'ordinary people' will find obvious, and it is also stated in the Royal College of Surgeons' guidance on good clinical practice, that 'a surgeon must not work when their health state is adversely influenced by *fatigue*, disease, drugs or alcohol'.<sup>38</sup> Hence, the *Bolitho* requirements are likely to apply to decisions about whether to medicate to prevent fatigue, such that the experts will be expected to weigh the risks and benefits of self-medication with a drug like modafinil, rather than simply follow the example of their peers. We explore how these might be weighed in the following sections.

#### A **Will the law oblige the doctor to take the pill? Applying the law to the scenario**

We now explore how the law described in this section might apply to our scenario, to determine whether a surgeon's duty of care might encompass an obligation on the surgeon to take the pill. The law's reluctance to find liability for a failure to act, while being prepared to place persons under a duty of care requiring them to act, places great weight on the distinction between acts and omissions. In many cases, whether the harm derived from the performing of an act, or from a failure to act so as to protect another or confer a benefit upon them, may turn on how we frame our answer to the question 'what caused the harm?' In the context of an obligation to enhance, this question is crucially important. We engage with this question by first exploring the original version of our scenario, in which the decisions to undertake the surgery and whether or not to take the pill are taken concurrently. We then extend the situation into a case of a subsequent decision whether or not to take the pill (once fatigue has, unexpectedly, become problematic), isolating this as a pure omissions question.

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<sup>37</sup> *French v Thames Valley Strategic Health Authority* [2005] EWHC 459 QB, [112].

<sup>38</sup> The Royal College of Surgeons of England, *Good Surgical Practice* (Devon: Latimer Trend & Company, 2008, reviewed 2010) 39 (emphasis added).

B      ***Original Scenario: Surgeon is Tired Prior to Commencing Surgery (the ‘already tired’ case)***

In the example given at the start of the paper, the facts are fairly simple: the surgeon decides to perform surgery when she knows that she is exhausted. She had a choice of two options: perform the surgery or not. When she realised she had the modafinil, she could also choose between taking it and not taking it. In this version of the scenario, these two decisions are taken at essentially the same time, namely before any surgery commences. As we are focused on her potential liability for omitting to take the modafinil, in the ‘already tired’ case she decides not to take the drug prior to commencing the surgery. She makes a fatigue-related error and the patient is injured.<sup>39</sup>

Which decision—performing the surgery or not taking the modafinil—is the potentially negligent one? Can we even say that one is negligent and the other is not? In our view, because the decisions are concurrent, there were three possible composite choices she could have made that need to be analysed:

1. Refuse to perform the surgery. The patient is sent elsewhere for treatment, but suffers harm *en route* due to the delay in receiving care (decision one); or
2. Perform the surgery without taking the modafinil. She would be performing surgery fatigued and unmedicated. The fatigue-related error occurs, harming the patient (decision two); or
3. Perform the surgery and take the modafinil. She would be performing the surgery unfatigued and medicated. She is not fatigued, so the error does not occur (decision three).

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<sup>39</sup> Establishing a causal connection between the fatigue and the error in a particular case would raise its own attendant problems, however we do not explore these here for reasons of scope. We note that there are, however, data showing a general connection between practitioner fatigue and medical errors. See, eg, M. Kramer, ‘Sleep Loss in Resident Physicians: The Cause of Medical Errors?’ (2010) 1 *Frontiers in Neurology* 128; C.P. Landrigan, J.M. Rothschild, J.W. Cronin, R. Kaushal, E. Burdick, J.T. Katz, C.M. Lilly, P.H. Stone, S.W. Lockley, D.W. Bates and C.A. Czeisler, ‘Effect of Reducing Interns’ Work Hours on Serious Medical Errors in Intensive Care Units’ (2004) 351 *The New England Journal of Medicine* 1838; D.M. Gaba and S.K. Howard, ‘Fatigue Among Clinicians and the Safety of Patients’ (2002) 347 *New England Journal of Medicine* 1249. See also Agency for Healthcare Research and Quality, ‘Making Health Care Safer: A Critical Analysis of Patient Safety Practices’ (AHRQ Publication 01-E058, 2001), Chapter 46 ‘Fatigue, Sleepiness, and Medical Errors’ 519-533.



We will make two assumptions about modafinil in analysing both this case and an alternative version of the scenario described below. Both assumptions, as we will later show, are highly improbable. However, we put these in place initially to present the best possible case for finding an obligation on a surgeon to self-enhance, and to isolate particular aspects of the debate over whether this obligation should be imposed. Further, by making these two assumptions and later removing and presenting evidence on the actual nature of modafinil's operation, this analysis allows us to demonstrate all the more starkly the extent to which these concerns speak against obliging surgeons to self-enhance. In doing so, we highlight precisely why arguments that surgeons will be obliged to take the pill rest take insufficient account of the realities of modafinil and the approach of the English courts to questions of whether one individual is expected to risk her safety for that of someone else.

First, we will assume modafinil has the effect of fully and predictably counteracting her fatigue (the 'first assumption'). In reality, the precise effects of modafinil vary from person to person and how beneficial these effects are varies for the same person depending on her context.<sup>40</sup> We will also assume that modafinil has no risks or side-effects associated with its use (the 'second assumption'). Again, this assumption is not supported by the current research on modafinil.<sup>41</sup> We will remove both of the assumptions later in the paper. We will show that even though we might find some obligation to enhance with these assumptions in place, the empirical realities of enhancement science in its present state speak strongly against finding any legal obligation at present.

Consider now decision one. Setting aside the possibility of taking modafinil, following *Bolam*, this decision (not to operate) would be negligent if a body of practitioners considered it better to run the risk of the patient suffering harm from a possible fatigue-related error, than running the risk associated with delaying care by diverting the patient to another hospital. It is a situation in which the relevant risks must be balanced to determine which course of action is likely to produce the best outcome for the patient.

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<sup>40</sup> See further below.

<sup>41</sup> See further below.

Once she recalls that she could take the modafinil, the situation is very different. Assuming it is both efficacious and safe, the risk balance shifts. Operating would not carry the risk of a fatigue-related error and she would have no good grounds for refusing to operate when this would expose the patient to the risks associated with being diverted. Assuming that she had initially come under a duty to care for the patient by accepting his case, she would then have failed to undertake a surgery on him that she would have been competent to perform, had she taken the simple precaution of taking the modafinil. This would be akin to refusing to operate because she couldn't be bothered to put on her glasses, thereby exposing the patient to the risk of dying *en route* to another hospital.<sup>42</sup> Depending on the context, she arguably failed to provide appropriate care to a patient for whom she had assumed responsibility.

But we need to be clear about what exactly constitutes the negligent act or omission in this situation if she makes decision one with both assumptions in place. The issues here do not relate to liability for *failing to take modafinil*, but rather for *failing to operate when she could have done*. Failing to take the modafinil is part of the context and an aspect of the doctor's duty, but the negligent omission is the failure to operate because it is this failure that exposes the patient to the risks associated with diversion, and so causes the harm. That said, this effectively means that the surgeon ought to have taken the modafinil in this situation, but it does not mean that she is *legally obliged* to do so. This is a semantic point to some degree, but it is important to be clear on this point as it will become important when we remove the assumptions in the discussion that follows.

Consider now decision two—she decides to operate but does not take the modafinil. She decides to run the risk of making a fatigue-related error. With our assumptions in place, this failure to medicate is clearly an omission. The surgery was needed and no one else could perform it, hence assuming the patient had been accepted for care, the surgeon was under a duty to do all a responsible surgeon would do. If her fatigue could have been entirely resolved by taking a safe and efficacious drug, and so render concerns about the dangerousness of her fatigue redundant, taking the modafinil would be equivalent to many other simple, non-harming precautions that a

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<sup>42</sup> Negligence here would arise only if she had accepted the patient and so assumed a duty of care.

responsible surgeon would, following *Bolam* and *Bolitho*, be expected to take. Handwashing is one simple example.<sup>43</sup> The Canadian case of *Stefanyshyn v Rubin* provides another.<sup>44</sup> In that case, a gynaecologist Dr Rubin failed to wear his prescription glasses while performing a hysterectomy, during which he inadvertently sutured the patient's left ureter to the upper vault of her vagina, causing a fistula. At first instance, the court found him negligent due to the failure to wear his glasses. However, the decision was overturned on appeal as the procedure had to be performed 'blind' because the location at which the suturing had to be performed is hidden from view during the hysterectomy procedure. Given this, the failure to wear the prescription glasses was causally irrelevant because he was not expected to be able to see what he was doing while suturing.

Dr Rubin's deficient eyesight is analogous to our hypothetical surgeon's fatigue. Both might be omissions that could cause an error to be made. It was clearly accepted in that case that had the ability to see where he was suturing been causally relevant, then the failure to wear his prescription glasses would have rendered Dr Rubin liable. He would have been liable for *omitting to wear* glasses while performing an operation. Assuming that wearing glasses is regarded as safe and efficacious, the analogy with our case would lead to the conclusion that our surgeon should take the modafinil to address her deficiency (that is, her fatigue). She should clearly take it, for failing to do so in such a situation renders her unfit to undertake a surgery she would otherwise be expected to undertake and would be capable of undertaking. In so failing, she exposed him to a risk of harm (her fatigue-related error) and he then suffered harm when she made just such an error. Not taking the modafinil would therefore constitute an omission for which she could be liable in negligence, when taken together with the context (in which she agreed to undertake the surgery) and our assumptions about modafinil.

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<sup>43</sup> Great Ormond Street Hospital, 'Clinical Guidelines: Hand Hygiene', at <http://www.gosh.nhs.uk/health-professionals/clinical-guidelines/hand-hygiene/> (last visited 22 May 2013).

<sup>44</sup> *Stefanyshyn v Rubin* (1996) 34 CCLR (2d) 88 (Manitoba CA).

If we turn now to decision three—she decides to operate and takes the modafinil—it requires little analysis. No harm results, and so we need not concern ourselves with any omissions liability.

Leaving our assumptions in place for now, we can therefore conclude that a surgeon might be legally obliged to take modafinil if she has taken the decision to operate in a fatigued state and there is a risk of harm as a result of that fatigue. She might also be *effectively* obliged to take the modafinil if she has accepted a patient and it is vital that she operate, however here the omission is more likely to be her refusal to operate.<sup>45</sup> At this point, we turn to a slightly different version of the scenario and undertake the same analysis. We will then remove our assumptions and revisit both scenarios.

**B      *An alternative scenario: the surgeon becomes tired during surgery (the ‘becomes tired’ case)***

In our ‘already tired’ case above, the decision to take the enhancer occurred at the point when the decision to perform the surgery was also being made. The issues differ if the decisions are not taken together. In our ‘becomes tired’ case, the scenario is slightly different. All of the facts remain the same, except that this time the surgeon is tired but not overly fatigued and believes herself capable of performing the surgery competently, given that it normally would take about two hours. She scrubs in, makes the first incision and proceeds to perform competently. However, an hour into the surgery, an unforeseen and unforeseeable complication arises. The surgery will now take in excess of eight hours to complete. She cannot simply close the patient up, and there is no one to take over from her. It is at this point that she recalls she has the modafinil in her coat and could ask a nurse to bring her the pills. Her decision about whether to enhance is separated in time from the decision to undertake the surgery. It is also now informed by how the situation has played out, as she is now aware that she is too fatigued to perform the remainder of the surgery competently. It is not an option to close the patient up and continue later as the surgery is at a point where this would mean certain death. Her choices therefore are to continue the surgery fatigued, or take the pills and then go on with the operation. We make the same assumptions about the safety and efficacy of modafinil here as we did in the ‘already tired’ case.

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<sup>45</sup> We return to this point in the section on framing the wrong below.

Where the surgeon *becomes* fatigued during surgery, we might reason thus:

1. Working while fatigued to a degree less than X (X-*n*) is not considered dangerous.
2. The surgeon is not liable for working when fatigued to degree X-*n*.
3. The duration of the surgery is such that (unforeseeably) the surgeon becomes fatigued to degree X and it is dangerous to continue.
4. The surgeon may breach her duty if she continues to perform the surgery, depending on the context.

In this example, while the initial decision to operate was not negligent, continuing to operate under the accumulated fatigue might be, *if the fatigue remains uncorrected*. Recall that in our example, there are no other surgeons who can take over from her (if there were, her decision to continue when fatigued to degree X would be clearly negligent). The doctor would be required to balance the risks of continuing against those of stopping the surgery. Following *Bolam* and *Bolitho*, her liability would turn on how a body of responsible medical practitioners would assess the balance of risks and consequently act. In such situations the surgeon must weigh the cost of taking the precaution that will avoid the harm, and the magnitude of the foreseeable risk that the harm will eventuate. Where the cost is high and the risk is low, it will be reasonable not to take the precaution, while a high risk that might be avoided easily will require the precaution to be taken.<sup>46</sup> In our situation, let us assume that there is both a high risk of harm from a fatigue-related error, and a high risk of harm if she ceases to operate and closes the patient up. She is, to put it bluntly, faced with an unenviable decision.

It is at this point that liability for omitting to enhance might arise. As we are assuming that modafinil is safe and efficacious, the surgeon now has three composite choices open to her:

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<sup>46</sup> The classic case on high cost precaution is *Miller v Jackson* [1977] 3 WLR 20 (CA), but the facts are far from analogous here. In that case, the claimants were unhappy that balls were sometimes hit into their garden from a nearby cricket ground. The cost to prevent this risk was considered too high as it entailed closing the cricket club, which would have been greatly damaging to the public interest. See also *Bolton v Stone* [1951] AC 850 (HL); *Tomlinson v Congleton* [2003] UKHL 47; [2003] 3 WLR 705 (no breach where the risk was low and the cost of the precaution high).

1. Stop the surgery. The patient is closed up, but dies due to the failure to complete the procedure (decision one); or
2. Continue the surgery without taking the modafinil. She would be performing surgery fatigued and unmedicated. The fatigue-related error occurs (decision two); or
3. Continue the surgery and take the modafinil. She would be performing the surgery unfatigued and medicated. She is not fatigued, so the error does not occur (decision three).

Here, our assumption extends to hold that the modafinil will ensure her fatigue level stays below X for the entirety of the time needed to complete the surgery. Part of the risk assessment now includes assessing options that will enable her to continue to operate. If there are no risks and only benefits associated with taking the modafinil, it seems clear that she ought to take the pill and continue the surgery. Of the three options before her, this would be the choice with the lowest risk of harm to the patient and the highest chance of a successful outcome.

Therefore, the possibility of liability for failing to take an enhancer arises if she decides to continue to operate but does not medicate, and then makes the fatigue-related error that harms the patient. The situation might be understood in a number of ways. We explore the two most plausible. First, we could say that a responsible body of surgeons would not have continued the surgery while fatigued, and therefore the surgeon *acted* wrongly in operating while tired (and unmedicated). If we take this approach, we effectively ignore the simple precaution of taking the modafinil and exclude it from the risk-assessment. This approach is unlikely to find support, given our assumptions and the risk of harm associated with stopping the surgery: certain death.

Alternatively, we could understand the situation more accurately as one in which the body of surgeons would analyse the three options and their relative risks as requiring two consecutive decisions. First, they might decide that continuing fatigued is less risky than stopping surgery altogether (an assessment that would be supported by the facts of our scenario). Finding themselves in the situation where continuing is certainly better than stopping, they face the second choice: to take the modafinil or not. If there are risks to the patient associated with continuing fatigued, and no risks

associated with taking the modafinil, it seems uncontentious that any reasonable body of surgeons would take the pill. Therefore, we could frame the wrong here as the failure to take the pill. The surgeon could be considered under an obligation to take it, and failure to do so would be a negligent omission.

A **Removing the Assumptions: The Realities of Cognitive Enhancement and a Surgeon's Obligations**

Thus far, we have concluded that a surgeon will be obliged to take safe, reasonable actions to address her own disabilities (such as wearing glasses to mitigate failing eyesight) and to avoid creating the potential for her to harm (such as practising good personal hygiene). We argued that the failure to do these things would lead her to fall below the standard of care expected of a surgeon, and her failure to act would be an omission for which she could be held liable in negligence. This view rested on the assumption that any risks associated with these actions were negligible or at least outweighed by the benefits to the patient and hence required as part of the surgeon's duty of care. To isolate the question of whether a surgeon might be obligated to take a cognitive enhancer, we assumed that modafinil was similarly safe and effective—and hence that its use was not risky—to render taking the pill analogous to actions that would be expected of the responsible surgeon. On this basis, we concluded that a failure to use a cognitive enhancer where needed to avoid risks could be considered a negligent omission. We now remove these assumptions about modafinil (and cognitive enhancement drugs generally) and revisit our analysis of the scenarios

B ***Efficacy and Variations in Effect***

In both scenarios, we presumed that the enhancer was efficacious and its effects were predictable (the first assumption). However, the efficacy of most enhancers is yet to be conclusively proven.<sup>47</sup> Even modafinil, one of the most promising, could not be said to be clearly efficacious. There is evidence to suggest that it can address fatigue, but this is disputed. The effects of fatigue on a person's performance in complex tasks such as surgery is itself complex, so to establish the efficacy of an enhancer in addressing these effects is also complex. Some studies do show improvements on some aspects of performance that are otherwise affected by fatigue—for example,

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<sup>47</sup> See n 22 above.

modafinil has been shown to improve some aspects of decision-making. However, there is little evidence that modafinil improves the deficits in psychomotor performance that result from fatigue.<sup>48</sup> Similarly, while some studies showed improvements in attention, others failed to do so.<sup>49</sup>

Additionally, the effects of enhancers vary between people in the extent to which they improve various cognitive capacities. For some users, modafinil is effective in addressing fatigue or improving cognitive capacity, but in others it has little or no effect.<sup>50</sup> It is also known that the impact of modafinil on an individual varies with the context in which he takes it.<sup>51</sup> These aspects of cognitive enhancement drugs (as they currently work) raise an important disanalogy with wearing glasses in that their effects are not very predictable. In this paper, our focus is on things a surgeon would be legally obliged to do in order to reduce the possibility of harm resulting. Such an expectation rests on the notion that in doing so, the chances of a harm resulting are reduced. Yet, this cannot be said to be true if the efficacy of the enhancer is so variable that its effects are not highly predictable. This concern is amplified when taken with the points to be made in the following sections about side effects, risks and bodily integrity. Further clouding any attempt to identify a duty to enhance is the practical consideration that a drug such as modafinil takes time to have an effect. Studies have shown that peak plasma concentrations have been obtained two to three hours following ingestion.<sup>52</sup> This would make it hard to know when a particular surgeon would need to have taken the modafinil to make it most likely that it would reduce the risk of error. It would also open up the complicating possibility that even a surgeon who took modafinil failed to discharge her duty because she failed to take it

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<sup>48</sup> Sugden and others, n 19 above.

<sup>49</sup> Randall and others, n 22 above.

<sup>50</sup> K. Finke and others, C.M. Dodds, P. Bublak, R. Regenthal, F. Baumann, T. Manly and U. Müller, 'Effects of Modafinil and Methylphenidate on Visual Attention Capacity: A TVA-Based Study' (2010) 210 *Psychopharmacology* 317.

<sup>51</sup> R.J. Thomas and K. Kwong, 'Modafinil Activates Cortical and Subcortical Sites in the Sleep-Deprived State' (2006) 29(11) *Sleep* 1471.

<sup>52</sup> Y. N. Wong, S. P. King, W. B. Laughton, G. C. McCormick, P. E. Grebow, 'Single-dose pharmacokinetics of modafinil and methylphenidate given alone or in combination in healthy male volunteers' (1998) 38 *J Clin Pharmacol* 276.



*in time*. However, given the unpredictability of the daily demands of surgical practice, the time-sensitivity of modafinil further speaks against imposing a duty.

Returning to our scenarios, we see that the uncertain efficacy of modafinil affects the legal obligations of the surgeon. In both, it makes decision to take the modafinil or not redundant because it cannot be said that taking it would have a guaranteed positive impact on the outcome. Therefore, it cannot be said that a surgeon *ought* to take it, because there is no evidence-base that demonstrates that it would uniformly affect the risk assessments made in the scenarios to determine what the surgeon should do. Failure to take the modafinil, therefore, is more like failing to wear glasses that are not guaranteed to have the correct lens parameters—it is simply irrelevant.

## B *Side effects and risks*

We presumed in both versions of the scenario that modafinil was known to be safe, and that hence where taking it would benefit the patient, the risk-benefit analysis undertaken by the responsible doctor would weigh in favour of taking the pill. However, it is not yet established that modafinil is entirely safe.<sup>53</sup> Most of the papers examining the effects of the main cognitive enhancer we are looking at—modafinil—were small in scale, and so generally did not use a standardised method for assessing adverse reactions. There are reports of a range of side-effects associated with modafinil, however, including headaches, dizziness, abdominal pain, dry mouth, nervousness, restlessness, sleep disturbance and heart palpitations. It is important to note also that the majority of studies conducted on modafinil were short term or single dose studies, and hence do not provide much data about long-term implications and the potential for dependency.<sup>54</sup>

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<sup>53</sup> See, eg, R. Kumar, 'Approved and Investigational Uses of Modafinil: An Evidence-Based Review' (2008) 68(13) *Drugs* 1803; B.D. McBeth, R.M. McNamara, F.K. Ankel, E.J. Mason, L.J. Ling, T.J. Flottemesch and B.R. Asplin, 'Modafinil and Zolpidem Use by Emergency Medicine Residents' (2009) 16(12) *Academic Emergency Medicine* 1311. Compare studies suggesting modafinil is well-tolerated: T. Roth, J.R.L. Schwartz, M. Hirshkowitz, M.K. Erman, J.M. Dayno and S. Arora, 'Evaluation of the Safety of Modafinil for Treatment of Excessive Sleepiness' (2007) 3(6) *Journal of Clinical Sleep Medicine* 595. It is clear that more research is needed over a longer period to establish safety: see, eg, M.R. Cooper, H.M. Bird and M. Steinberg, 'Efficacy and Safety of Modafinil in the Treatment of Cancer-Related Fatigue' (2009) 43(4) *Annals of Pharmacotherapy* 721.

<sup>54</sup> See D. Repantis, P. Schlattmann, O. Laisney and I. Heuser, 'Modafinil and Methylphenidate for Neuroenhancement in Healthy Individuals: A Systematic Review' (2010) 62 *Pharmacological Research* 187, [5.3]; D. Kim, 'Practical Use and Risk of Modafinil, a Novel Waking Drug' (2012) 27

It is likely that English courts will be deeply reluctant to require a doctor to take any medication until its safety is very well established.<sup>55</sup> Thalidomide, diethylstilbestrol (DES) and nicotine were all considered safe until their deleterious health effects emerged, often with tragic consequences.<sup>56</sup> In our view, these lessons from history, taken with the English courts' own experience with the impact of asbestos on so many will render them wary of obliging surgeons to enhance themselves via medication.<sup>57</sup> It is also worth noting that no drug can really ever be said to be entirely safe; we can only ever really claim that it *appears* to be safe *for the most part*. Given this, in our view it is unlikely that the English courts will place an obligation on anyone to take a medication for the sole benefit of someone else.

The use of enhancers to stay awake has a side-effect of another kind, which we argue also speaks against obliging medical practitioners to take it. Even if the safety of modafinil or similar enhancers could be assured, the very nature of its intended usage means it has problematic effects (rather than 'side-effects') that speak against the courts obligating surgeons to take it. While the drug does restore wakefulness, it does not remove the need to sleep. Users must still make up the sleep later, or build up a 'sleep-debt'. It is well-established that long-term lack of sleep has serious health implications, and given moves already made to reduce the extended hours worked by medical practitioners, it is unlikely that this alternative means of robbing them of their sleep will find support. Not only would this go against current policy trends, it would also promote the normalisation of a drug that leads eventually to chronic fatigue, unless the doctors taking it are granted long periods away from work to pay back their

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*Environmental Health and Toxicology* 1. Other studies did not detect any serious side effects: Randall and others, n 22 above; Sugden and others, n 19 above; S. E. Winder-Rhodes and others, n 22 above.

<sup>55</sup> It would be interesting to see how the court would handle a claim that a surgeon had caused harm by failing to take a medication that has a much stronger safety-profile. It is at least conceivable that a surgeon who suffered from a bad headache might be sued by her injured patient who claims that she was negligent in not taking paracetamol. However, to consider such a possibility here would be just as speculative since, to our knowledge, there have been no such cases. Further, it is important to note that even a drug like paracetamol is not one hundred percent safe for all individuals.

<sup>56</sup> On the courts' experience with the fallout from asbestos, see *Fairchild v Glenhaven Funeral Services* [2002] UKHL 22; [2002] 3 WLR 89 (HL) and subsequent cases. On thalidomide as a cause of birth defects, see G. Dunea and J. M. Last, *The Oxford Illustrated Companion to Medicine* (Oxford: Oxford University Press, 3rd edn, 2001), 'Thalidomide'. On DES, see National Cancer Institute 'Diethylstilbestrol (DES) and Cancer' (National Cancer Institute Factsheet, 2011) at [www.cancer.gov/cancertopics/factsheet/Risk/DES](http://www.cancer.gov/cancertopics/factsheet/Risk/DES) (last visited 23 May 2013). We are grateful to Professor Jane Stapleton for this point.

<sup>57</sup> We are indebted to Professors Peter Cane and Jane Stapleton for inspiring our ideas on this point.

debt of sleep (which is unlikely to be the case). Chronic fatigue has its own implications for patient safety, in addition to the impact on the practitioner's own health, because as noted earlier, fatigue is also associated with higher rates of medical errors.

Further, once taken, one cannot simply 'switch off' the effects of an enhancer. For example, modafinil has a 12–15 hour elimination half-life, meaning it takes about this amount of time for the drug to lose half of its pharmacologic activity in the body.<sup>58</sup> Consequently, a surgeon taking the enhancer will potentially remain awake for many hours beyond the time when she has finished the surgery. She will find it difficult to go to sleep, pushing back the time at which she could go to bed and refresh herself for the next day's work.<sup>59</sup> Unless she is fortunate enough to have an opportunity to catch up her lost sleep, she will very likely have to come to work at her normal time on her next working day, and so will both accrue a sleep-debt, and be fatigued at work.

For these reasons, it is unlikely that taking enhancers such as modafinil will become the norm in the near future. Given this, the situation in which a medical practitioner might be expected to take the risk of using the enhancer for the patient's benefit will be a very rare one in which there no other choices open to the surgeon and the health risk to her health is reasonable relative to the benefits to the patient.<sup>60</sup> The facts in our scenario are unusual. More likely, there will be another hospital or another doctor to provide care. But even if there was not, and our fictitious situation did arise, we argue that English law would not expect the surgeon to risk her safety, even if she had assumed responsibility for the patient.<sup>61</sup> Surgeons are expected to provide appropriate care, and this could conceivably encompass taking safe medications, but they are not

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<sup>58</sup> P. Robertson Jnr and E.T. Hellriegel, 'Clinical Pharmacokinetic Profile of Modafinil' (2003) 42(2) *Clinical Pharmacokinetics* 123.

<sup>59</sup> See further M. Gill and others, 'Cognitive performance following modafinil versus placebo in sleep-deprived emergency physicians: a double-blind randomized crossover study' 13 *Academic emergency medicine : official journal of the Society for Academic Emergency Medicine* 158.

<sup>60</sup> As noted above at n 46, particularly the decisions in *Bolton v Stone* and *Tomlinson v Congleton*, the surgeon would be expected to balance the relative risks and benefits.

<sup>61</sup> For example, in *Baker v TE Hopkins & Son Ltd* [1959] 3 All ER 225, while one might argue that Dr Baker was under a moral duty to do what he could to aid the men down the well, he was not under any legal duty to assist them where he had undertaken no obligation towards them, and where he would have been putting himself at considerable personal risk in attempting to rescue them (as, in fact, he did in attempting, fatally, to aid them). We are grateful to one of the blind reviewers for drawing our attention to *Baker* in support of our point.

expected to take undue personal risks to themselves to provide treatments for others. We conclude this based on the law's position with regard to rescuers, including professional rescuers, who are not considered to have accepted the risks associated with rescuing. English law holds that a person who requires rescuing from a self-inflicted accident can in fact owe a duty of care to the person who comes to his or her aid.<sup>62</sup> The rescuer's claim cannot not be defeated by arguing a defence of *volenti non fit injuria*, nor will the rescuer's award generally be reduced for contributory negligence if her own actions contributed to harm she suffered during the rescue (where they were reasonable actions for a rescuer in her position to take).<sup>63</sup> Given this, and the general resistance to a duty of rescue, English courts are unlikely to extend a surgeon's duty to risk her own health for the sake of a patient. We explore this issue further below in the section on bodily integrity and autonomy.

**A Some further objections to obliging surgeons to cognitively enhance themselves**

We now conclude by exploring three further considerations supporting our contention that it is highly unlikely, given the present state of the science, that the courts will find our surgeon obligated to take the pill. These are: the English common law's commitment to protecting bodily integrity and individual autonomy; the law's likely approach to framing the wrong in cases of this kind; and the policy concerns raised by obliging medical practitioners to enhance themselves in the workplace.

**B *Bodily Integrity and Autonomy***

The principle of respect for bodily integrity finds strong support in the English legal system. Almost any form of touching of another requires consent, without which the toucher may be liable in both tort and criminal law. As Lord Mustill put it in *Bland*, 'any invasion of the body of one person by another is potentially both a crime and a tort'.<sup>64</sup> Similarly, we are free to refuse medical treatment, even life-saving treatment.<sup>65</sup> In general, people are not legally obliged to have their bodily integrity infringed for

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<sup>62</sup> See variously *Harrison v British Railways Board* [1981] 3 All ER 679 (QB); *Ogwo v Taylor* [1987] 3 WLR 1145 (HL).

<sup>63</sup> *ibid.*

<sup>64</sup> *Airedale NHS Trust v Bland* [1993] AC 789, 891 (Lord Mustill).

<sup>65</sup> *St George's Healthcare NHS Trust v S*, n13 above.

the benefit of others. Vaccinations are not compulsory, and those carrying infectious diseases may only be quarantined where there is a risk of ‘significant harm to human health’.<sup>66</sup> In *St George's Healthcare NHS Trust v S*, the Court of Appeal held that a woman was entitled to refuse a caesarean section, even where both her life and that of her 36-week-old foetus would be placed in jeopardy by that decision. The woman’s autonomous choice about how her body could be treated must be respected, even where her decision ‘may appear morally repugnant’.<sup>67</sup> While a foetus is not considered a person under the law, it is not ‘nothing’ either, and it is clear from this decision that the law is strongly committed to respecting individual autonomy.

Given this, we argue that the law’s commitment to autonomy and respect for bodily integrity makes it unlikely that a surgeon would be obliged to ingest a pharmaceutical substance for her patient’s benefit, even though she owes him a duty of care. In the United States, there is authority to suggest that a person might be obliged to take anti-psychotic medications where a failure to do so placed him at risk of losing control and harming others.<sup>68</sup> However, this authority has not been followed in the English system, just as other similar erosions of respect for bodily integrity have not been mirrored in this country.<sup>69</sup>

## B *Framing the Wrong*

There are few cases in English law that are analogous to our scenario, and we are not aware of any cases of a person being obliged to self-medicate prior to or during performance of a job, where a failure to do so has resulted in liability. In looking for analogies, we broadened our search to cases simply involving self-medication and harm resulting from failure to medicate. Two bodies of potentially analogous case law emerged: road accidents caused by unmedicated epileptic drivers, and accidents resulting from a loss of control due to the driver suffering hypoglycaemia. Neither body of case law is particularly analogous to our scenario, but nevertheless we will

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<sup>66</sup> *Health and Social Care Act 2008*, s 45G. Vaccinations are required for entry into certain professions, such as the medical profession, but this does not amount to obliging people to vaccinate.

<sup>67</sup> *St George's Healthcare NHS Trust v S*, n13 above, 957 (Judge LJ). We are indebted to Professor Jane Stapleton for reminding us of the relevance of this decision.

<sup>68</sup> *Carolyn Swift and anor. v Fitchburg Mutual Insurance Company* (1998) 45 Mass App. Ct. 617, 621.

<sup>69</sup> For example, the UK has not followed the example of the United States in incarcerating women who abuse substances during pregnancy on the grounds that they recklessly endanger their foetus.

draw from them a general point about how the law might frame a decision not to medicate where there is a risk of harm to another. In such cases, the courts tend to focus on an *act* that might be said to cause the harm, rather than the *omission* or the failure to take the medication. This is an important distinction in the context of the use of enhancers, because if a similar approach is taken to their use, it is likely that the courts will focus on the decision to undertake or continue surgery (and assess it on its own merits), rather than the failure to medicate. In doing so, the courts are unlikely to regard that failure to medicate as the negligent cause of the harm, and so would not attach liability to the pure omission. This conclusion is supported by our analysis of the courts' position on respect for bodily integrity.

Cases involving a failure to medicate prior to driving are somewhat analogous to our 'already tired' case. They involve a decision by someone who knows they suffer from a condition that could render them incapable of driving safely, and which can be controlled by medication. That person chooses not to take the medication in full knowledge of this risk prior to driving. This is analogous to our fatigued surgeon, where she chooses not to take the modafinil in full knowledge that her fatigue is a condition that puts her at risk of making an error while operating and so causing harm to the patient. In both cases, the decision not to medicate occurs prior to the events that lead to the harm. Put another way, the decision to drive or operate occurs concurrently with the ongoing decision not to medicate. Below, we examine one case on epileptic driving, then turn to the hypoglycaemia cases.

In *R v Remi Akinyeme*, the defendant had an epileptic fit while driving, leading him to hit and kill a cyclist. He had not taken his medication prior to driving, and was aware of the risk of seizure and its possible consequences if he did not self-medicate. In that case, the wrong was framed as the act of driving when there was a risk of his having a fit (because he was unmedicated), not as the *failure* to medicate when driving itself.<sup>70</sup> In that case, the court framed the wrong as the *act* of driving whilst in an unmedicated state, rather than as a *failure* to have taken medication before driving. The court's focus was on what the person did in his particular (chosen) state, rather than his decision about whether to self-medicate. The decision of whether to self-medicate is

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<sup>70</sup> *R v Akinyeme (Remi)* [2007] EWCA Crim 3290; [2008] RTR 20 (CA).

one for the individual, whereas the decision to drive is one in which the court takes an interest. That decision not to self-medicate formed part of the circumstances in which the wrong occurred; it was not the wrong in itself.<sup>71</sup>

Applying the same approach to our scenario, we would frame the negligent cause as the *act* of operating while unmedicated but fatigued. The failure to take the modafinil is part of the surrounding circumstances, but would not itself constitute negligence. The decision to operate, as the cause of the harm, becomes the focus of the inquiry and is then judged in the wider context of the needs of the patient, the availability of other surgeons and the risks associated with operating while tired. Seen in this light, our surgeon was in an invidious position and is not likely to be found liable if there were no good alternatives (bearing in mind the unknown risks and uncertain efficacy of modafinil). On this reasoning, it is unlikely that we could say that the surgeon was obliged in any legal sense to take the pill.<sup>72</sup>

The analogy is with cases like *Akinyeme* is, however, imperfect. For the most part, once a driver begins driving, he could stop at any point. Therefore, it is quite easy to frame the wrong as the *continuing* act of driving while in a risky state. Failing to medicate before or whilst driving is not isolated as an omission because the act of driving is not something that must continue: the driver can cease this risky act. But, in the case of our surgeon, this may well not be so. She cannot simply stop the operation (just as she might have had little choice about whether to commence it in the first place) because of the risks to the patient. Therefore, once she has started the operation, the decisions about what she does *given that* she must continue have to be the focus. Here, the decision about whether to medicate is taken in the context of performing the surgery, in contrast to the individual's decision about whether to drive in the context of being unmedicated. As we have argued, if modafinil is regarded as entirely safe, the decision to not take it could then be isolated as a negligent omission.

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<sup>71</sup> That said, in determining the appropriate sentence for the offence, that failure was considered an 'aggravating factor': *ibid*, [20].

<sup>72</sup> In the United States there is authority that the failure to medicate would be regarded as a negligent omission, and there are cases in which the failure to take anti-epilepsy medication was framed as a negligent omission: *Knoxville Optical Supply, Inc. v Thomas*, 1993 WL 574 (TennCtApp Jan 04, 1993).

Related to the cases of failing to medicate before driving are those concerned with drivers who lose control of a their vehicle due to suffering a hypoglycaemic episode.<sup>73</sup> These cases are also not framed as omissions cases, although some could be framed as instances of failing to adequately monitor blood glucose, or to take sugar when needed. Rather, in such cases the wrong is framed as continuing to drive once it has become apparent that one is impaired. It is this aspect of the cases that has some degree of analogy to our scenario in its extended form, where our surgeon feels herself becoming dangerously tired.

There is a considerable body of criminal and civil decisions around instances of hypoglycaemic episodes,<sup>74</sup> and one of the key principles emerging from them is that if one finds oneself becoming impaired while driving yet continues to drive and subsequently loses conscious control and causes harm to another, one will be criminally responsible and liable in negligence.<sup>75</sup> However, if one becomes unconscious without having any prior indications that this will occur, responsibility for the resulting harm will not be found. For example, in *R v Clarke*, a diabetic driver suffered a hypoglycaemic attack, lost control of his car and mounted the footpath, where he hit and killed a four-year old boy. In this case, the evidence suggested that prior to the full loss of consciousness, there was a short period in which the defendant Clarke was aware that he was experiencing a severe drop in blood sugar that would end in a full hypoglycaemic episode occurring. Clarke failed to stop the car or take sugar to arrest his deteriorating condition, despite having glucose tablets in his car as diabetic drivers as advised to do. Clarke was found criminally liable for the boy's death as a result of taking the risk of continuing to drive when he knew that his

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<sup>73</sup> Many thanks to Dr Sarah Green for drawing our attention to this line of cases.

<sup>74</sup> Sufferers of Type 1 diabetes are at risk of such episodes, as they are required to monitor their blood sugar and adjust it through the injection of insulin. A hypoglycaemic episode occurs when the body's blood glucose level drops such that there is insufficient sugar to balance the levels of insulin in the body. Hence, if a diabetic injects too much insulin or fails to take enough sugar, she may become hypoglycaemic, which leads to impaired cognitive ability and in some cases partial or complete unawareness. Normally, a diabetic will begin to sweat at the onset of a hypoglycaemic episode. Sweating occurs as the liver secretes glycogen to temporarily compensate for the imbalance in sugar/insulin levels. This warning sign generally occurs before the loss of cognitive function, and so the diabetic will have the opportunity to correct the condition by taking glucose. Once glucose is taken in some form, the person rapidly returns to their normal cognitive state.

<sup>75</sup> There are important distinctions between the criminal and civil decisions on the issue of voluntary control and automatism, and these are discussed at length in cases such as *Mansfield v Weetabix Ltd* [1998] 1 WLR 1263, but these do not concern us here.



capacity to do so was significantly impaired and likely to deteriorate even further.<sup>76</sup> A similar position was taken on awareness of impairment in *Mansfield v Weetabix*, in which the driver Terence Tarleton's hypoglycaemic episode during a 40-mile journey on behalf of his employer Weetabix led him to drive erratically, eventually crashing into the claimants' shop, where he caused extensive damage. Lord Justice Leggatt held in cases of negligence, whether such a disabling event came on gradually or otherwise, liability would only attach if the driver knew or ought to have known he was becoming unfit and continued to drive regardless.<sup>77</sup>

In the context of an obligation to take a cognitive enhancer, these decisions have some important implications. They suggest that once someone realises, or ought reasonably to realise, that they are *becoming* impaired, they will be liable in negligence if they continue to act and then injure someone after they subsequently become entirely impaired. Here, the analogy is with our 'becomes tired' case, in which our surgeon realises she is becoming dangerously tired. Following these authorities, she ought to stop the surgery. Her wrong would be continuing to operate when at risk of making a harmful error—she would effectively be allowing herself to run the risk of harming another, just as the unconscious person in charge of a moving vehicle does. For the most part, in these cases the episodes came on either in a manner that could not be foreseen, or despite the defendant's efforts to take insulin and monitor his blood glucose. Therefore, they tell us that it is wrong to continue to act once one knows one is impaired. However in our scenario stopping the surgery is not a viable option as the patient will almost surely die. The next worst option, then, is to continue and take the risk as we explored above. This important disanalogy suggests that our surgeon will not be held liable in the same way a driver who becomes aware of his impending impairment would be liable.

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<sup>76</sup> *R v Clarke (Trevor Norman)* [2009] EWCA Crim 921; [2010] 1 Cr App R(S) 26 (CA).

<sup>77</sup> On the facts, Tarleton was not aware he was have a hypoglycaemic episode and there was no reasonable basis on which to say he should have been aware: *Mansfield v Weetabix Ltd*, n 75 above. A similar approach is taken in situations where people have suffered heart attacks, strokes and gastric attacks and then injured others while in an incapacitated state. In these cases, too, the issue is whether the defendant was or ought to have been aware that she was about to lose conscious control of herself and yet continued to drive regardless. See, eg, *Waugh v James K Allan Ltd* 1964 SC 102 (HL); *C (A Child) v Burcombe* [2003] CLY 3030; *Roberts v Ramsbottom* [1980] 1 WLR 823 (QB).

We can draw another conclusion from these cases, albeit a limited one, that supports our analysis of the scenarios when our assumptions about the safety and efficacy of cognitive enhancers remained intact. In two cases, there was some discussion of whether the defendant could have addressed the impairment. In *Clarke*, it was noted that he could have taken sugar he kept in his car to avoid his impairment. A similar possibility was explored in *R v Gilbert*.<sup>78</sup> We can then draw an analogy between taking glucose to avert loss of cognitive capacity due to hypoglycaemia, and taking modafinil to avert the cognitive impairments associated with fatigue. On its face, it would seem that in cases of negligence, the reasonable surgeon or pilot might be expected to take the substance that will avert this loss of capacity, particularly where they lack the option of ceasing to fly or perform surgery (the equivalent of lacking the option to pull over and stop driving) and the enhancer is safe. However, as we argued earlier, this analogy breaks down once we remove our assumptions, because there is an important disanalogy between taking a clearly safe substance such as glucose, and a new pharmaceutical substance that has not been used for long periods of time that may have side effects of which we are as yet unaware.

#### ***Policy Considerations and the Working Environment for Medical Practitioners***

B

Surgeons, like many other medical practitioners already often work long hours performing complex operations. They work in a stressful environment where the stakes are high and they are under pressure from many sides. Healthcare resources are necessarily under strain, and this strain is not likely to ease in the foreseeable future. One can readily imagine the attractions to hospitals and other employers of medical staff of a drug that can enable practitioners to work longer hours without a reduction in capacity. One can also foresee the development of a medical culture in which taking enhancers is progressively normalised if those enhancing drugs offer benefits with minimal side-effects. Such increasing use and associated normalisation is already emerging in the context of student use of enhancers to extend study time and improve focus.<sup>79</sup> Yet, long-term effects of modafinil and other enhancers remain unknown, although we do know that they produce unwelcome side-effects in some users. This,

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<sup>78</sup> *R v Gilbert (Jean)* [2006] EWCA Crim 3276 (CA).

<sup>79</sup> See, eg, R. Goodman, 'Cognitive Enhancement, Cheating, and Accomplishment' (2010) 20(2) *Kennedy Institute of Ethics Journal* 145.

coupled with the creation of harmful sleep-debts in those who take them regularly, raise serious concerns about the well-being of people were they to be expected or required to take such enhancers. Given this, in our view it is unlikely that the courts will support the development of a culture in which cognitive enhancement via pharmaceuticals is normalised and encouraged. Far more often, the English courts avoid adding to such pressures on those already in a position where an employer might place unreasonable expectations upon them. This is supported by legislative measures that require employers to ensure the safety of the workplace, and the rejection of *volenti non fit injuria* as a general defence to the acceptance of workplace risks in the absence of ‘danger money’ to absolve employers of responsibility for failing to maintain a safe workplace.<sup>80</sup>

## A

### Conclusion

As research into the effects of so-called ‘cognitive enhancers’ continues, calls for their use to improve performance and avoid harms are likely to increase. Where taking such a pill might ensure better outcomes in surgery, or reduce the risk of injury from car and air accidents, then there may well be good reasons for people in such professions to take them. But as we have demonstrated, at present we have too little knowledge of their current and future side-effects to require people to ingest potentially harmful medications for the benefit of others. Their efficacy is uncertain, and our commitment to respecting individual autonomy and bodily integrity is a fundamental principle of the English common law. For these reasons, it is unlikely that an English court or the legislature will place surgeons, or others in professions where enhancers might affect their performance, under a *legal* obligation to take cognitive enhancing pharmaceuticals. It may be that a surgeon can perform better when she takes an enhancer like modafinil, but to find her negligent and therefore liable for harm to her patient resulting from a fatigue-related error is well beyond the law at present. The English law does not find people liable in negligence for failing to ingest medications, and with good reason. Given the potential for unknown harms to users, and the sound reasons for respecting medical practitioners’ autonomy, this is

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<sup>80</sup> On the requirement to provide a safe system of working, see *Wilsons & Clyde Coal Co v English* [1938] AC 57 (HL), and on an employer’s responsibilities in relation to workplace stress see Goodman, *ibid.* On the *volenti* defence see *Bowater v Rowley Regis BC* [1944] KB 476 (CA).

also the right position for the law to take until far more is known about these drugs of which so much is promised.