

**'Fit for Work?: Redefining 'Normal' and 'Extreme' Through Human  
Enhancement Technologies'**

**Brian Bloomfield and Karen Dale  
Department of Organisation, Work and Technology  
Lancaster University, UK**

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## Introduction

"They're bulking up mentally

*Academics, musicians, even poker champs take pills to sharpen their minds, legally. Labs race to develop even more" Los Angeles Times (2007)*

In 2012 the medical journal *The Annals of Surgery* reported a randomized controlled trial conducted to see whether modafinil, a drug ordinarily prescribed for narcolepsy, a sleep disorder,<sup>1</sup> might improve the cognition of sleep-deprived medical doctors. The article concluded positively that "fatigued doctors might benefit from pharmacological enhancement in situations that require efficient information processing, flexible thinking, and decision making under time pressure" (Sugden et al, 2012:222). Though contested, modafinil is considered by some to be a so-called 'smart drug', a cognitive enhancer, but whether proof of its efficacy becomes accepted, not to mention its safety for doctors and patients alike, only time will tell.<sup>2</sup> Arguably, the real significance of the trial lies in the fact that it is emblematic of a broad spectrum of current research programmes - collectively described by the phrase 'human enhancement technologies' (HETs) - that aim to open up new ways in which the human body might be improved. Humans have long sought to go beyond the constraints of biology, but the current trend in enhancement technologies seems to mark something of a departure.<sup>3</sup> According to a variety of sources, including scientific, popular science writing and journalistic accounts, we may be on the threshold of a series of radical technological developments, some of which offer the prospect of widespread applications in the work environment across a whole array of professions (e.g. *The Economist*, 2008).

Amid the plethora of publications addressing the area, a report from the Academy of Medical Sciences (2012) detailed the deliberations of a workshop<sup>4</sup> assembled to consider the specific implications and challenges of enhancement technologies in the context of the future of work. It suggested, for example, that people's working lives might be extended, with the deficits of the aging body compensated by new technology such as drugs for 'cognitive maintenance' or bionic limbs to restore mobility. Individuals might be rendered more creative and attentive through smart drugs; or those who through disability or deficiency of skill have hitherto been prevented from entering certain occupations, might overcome their disadvantage through appropriate assistive/technological enhancement, such as auditory aids and retinal implants to improve sensory perception. The speculations even stretched to include problems of motivation at work: "the use of cognitive enhancers or brain stimulation might be of interest to employees who find aspects of their work less stimulating" (Ibid.:22). The report also included enhancements through gene therapy and tissue engineering, nutritional/lifestyle changes, and cosmetic enhancement for an ageing workforce in order to improve the prospects of employment (Ibid.:23).

Such possibilities inevitably involve a host of assumptions and invite a variety of difficult questions. The ethical dimensions of the use of enhancement technologies have been widely considered (e.g. Delgado et al, 2012; Illes and Sahakian, 2011; Russo, 2007), but thus far there has been very little consideration of these technologies vis-à-vis employment relations. Further, the deliberations of scientists and ethicists have also failed to recognise that existing employment structures might shape the development and use of these technologies. Against this background this paper considers developments in enhancement

technologies with specific reference to the implications for work and the organisation of work in the context of 'advanced' capitalist economies. In particular we believe that these developments in human enhancement prompt questions about how the categories of 'normal' and 'extreme' in the context of work might be construed and renegotiated.

As can be seen from the proposal of smart drugs for overworked doctors, enhancement technologies potentially address and intervene in the conduct of 'extreme' work. In these cases HETs can be deployed to facilitate the intensification of work: "normalized intensity" (McCann et al 2008). As we discuss, at the core of the social imaginary of human enhancement (Delgado et al 2012:207) is a rather uncritical stance regarding current norms and trends in employment practices. This reaffirms rather than challenges the contemporary organisation of work and all its associated pitfalls; not to mention the received wisdom that work is a key (unproblematic) source of social identity and personal fulfilment. Thus, doctors may be fatigued through overwork but the prescription is pharmaceutical enhancement rather than any reorganisation of society's resources and the training of more medical staff. In short, the development of HETs might foster the normalization of 'working extremely' – enabling longer working hours, greater effort, increased concentration or attention. Not only this, but such technologies foster the conditions of possibility under which workers are able to work on themselves such that they can go beyond the norm and become 'extreme workers'.

Despite the apparent novelty of the putative enhancements there is more than a hint of the technological fix surrounding them. In a way this is hardly surprising: technology frequently represents a solution to the problems that a society or culture poses for itself and in so doing the prevailing vested interests, institutionalized ways of thinking, and the dominant technological enframing of the problems of social ordering and organizing tend to remain intact and unchallenged. This means that it is crucial to consider the prevailing milieu within which new technologies are emplaced. For example, unlike the state endorsed mass medication of the population envisaged in classic dystopian novels such as *Brave New World* ("soma") or *Do Androids Dream of Electric Sheep* (courtesy of the "mood organ"), promotion of the new smart drugs very much tends to be articulated in neo-liberal terms: encompassing all sections of society, and envisaged as a matter of individual choice. However, the dangers of coercion in the context of employment, the vagaries of the labour market, and the further retreat of the state amid talk of 'contribution' rather than 'entitlement', are all too evident. Some people may of course wish to work longer hours or well into their old age, but for others there may be precious little choice. Moreover, under what conditions are 'free choices' actually realised? The more we define ourselves through the conceptual categories offered by the new enhancement technologies – for example, the self, its capacities and limits conceived in terms of brain chemistry - the more we open ourselves to new modalities of inspection and intervention whilst concomitantly being invited to discipline ourselves through the new technology so as to become aligned with the preferred subjectivities of the workplace and society beyond (Rose, 2007). That said, it is important to stress that we are not in the business of futurology, hyperbole or scaremongering, and indeed there is a danger of "over claim" (Rose, cited in Academy of Medical Sciences, 2012:35). But, it is precisely because technology does not emerge *ready-made* or within a social vacuum that it must be subjected to inclusive debate and scrutiny. Indeed, it is important to foster debate and endeavour to shape the course of its development before it becomes black-boxed and a product of too narrow a range of

interests. Given the broad range of technologies covered by the term human enhancement technologies, in this paper we narrow the focus of our argument to those which target the modification of the body through pharmacological drugs.

The rest of the paper is structured as follows. In the next section we explore certain occupations that might be described as ‘extreme work’ or ‘extreme jobs’ because of the conditions under which they are undertaken, making specific reference to the military which requires a supply of bodies that are able to sustain the extreme demands of combat conditions as well as producing large numbers of damaged bodies that are subject to study and repair. As Hacking (2006:14) has commented: “War was the teacher of neurology... Prosthetic limbs... plastic surgery...” Because of such conditions, the military has often served as a test bed for new bodily engagements with technologies prior to their take-up within a civilian context. When it comes to ‘extreme jobs’, such as the military and emergency services, the use of enhancement technologies may come to be seen as necessary and thus socially acceptable because of the extremity of the circumstances of work. We develop this argument further by noting the contemporary trend for ‘normal’ jobs to be carried out in more ‘extreme’ ways - primarily by the intensification of hours or effort; distinguishing the latter from ‘extreme work’ by describing it as ‘working extremely’. The section that then follows is concerned with the connection between working extremely and the emergence of the ‘extreme worker’. Noting that, historically, a key managerial problematic has involved fitting workers to jobs based upon an assumption of employee abilities distributed around a norm (Hollway, 1991), we argue that enhancement technologies might be seen to allow a greater degree of flexibility in this regard by allowing more individuals to perform at or above the norm. The paper considers how ‘working extremely’ relates not only to the demands that organisations and managers may place on employees, but must be juxtaposed alongside the rise of what we describe as the ‘extreme worker’: the individual who willingly embraces the intensification of their working life. In this connection enhancement technologies not only invite and underpin the practices of ‘working extremely’, thereby normalising such patterns of work – as implied by the modafinil trial amongst fatigued doctors – but also normalise employee subject positions that facilitate and even welcome work ‘beyond the norm’. The penultimate section then turns to consider the renegotiation of the normal/extreme boundary of work and working in relation to the contemporary “ideology of work” (Anthony, 1977) which emphasises individuality, choice and freedom. We contend that from this perspective, workers’ enhanced bodies might represent a literal internalisation of these values.

### **Enhancement technologies: from ‘extreme work’ to ‘working extremely’**

Human enhancement technologies have often been developed, tested and utilised within working situations which are considered to be ‘extreme’. In these forms of employment there is a sense that the very extremity of the work allows solutions to be sought that would not be deemed acceptable in ‘normal’ working conditions. Indeed, there is an imperative to find better ways of enabling these jobs to be carried out, whether it is with less risk or less cost (including the human cost). However, we argue that it is not just in areas of recognised ‘extreme work’ or ‘extreme jobs’ such as the military, that employees are likely to use enhancement technologies. We see HETs working in tandem with and facilitating what McCann et al (2008) describe as “normalised intensity”. The use of HETs might move from ‘extreme’ jobs and situations to ‘normal’ ones, from the military and emergency services

ultimately into offices and factories of all sorts. In this way what is seen as socially acceptable changes from those occupations/situations which are seen as exceptional, to those which are seen as 'normal' everyday occupations. But now through the use of HETs the parameters of the work itself can be changed and generally extended in terms of time spent on work, greater intensity of work effort, longer concentration and emotional control or heightening of responses, depending on the enhancement technologies used. Enhancement technologies, then, have a significant organisational and political dimension since their sanctioned use could directly reinforce employers' interests, through top-down restructuring and downsizing; or coercion from managers or peers, or indirectly by employees choosing to enhance themselves to better compete or survive in the labour market.

'Extreme work' (or 'extreme jobs') might be described as that carried out in dangerous, high-pressure, unpredictable, risky situations. This definition might be elaborated further by considering that it may be the environment which is extreme e.g. war, space, emergencies and disasters, underground mines or under the sea, deserts and mountains, or it may be the task itself that is extreme e.g. bomb disposal work, military fighting, firefighting, paramedical work, policing, lifeboat rescue work, or in many cases it may be a combination of the two. These extreme work situations may also be linked to particular organisational challenges. For example, Jones and Hinds (2002) link extreme work in police emergency response (SWAT) teams to conditions of spatially dispersed team membership, which produce challenges of co-ordination and action, where the costs of a failure to share awareness of the situation are high (cf. Weick 1993). Therefore the notion that we might be able to distinguish between what might be defined as 'extreme work' and that described as 'normal work' is problematic. For example, in some jobs something which is mundane on a day-to-day basis, such as working in a nuclear power plant, can be critical if things go wrong and suddenly become extreme.

Work may also be defined as extreme because of the effects that it has on the human worker undertaking them e.g. psychological stress, physical stress and wear and tear, psychological trauma including post-traumatic stress disorder; sleep deprivation; subjection to low oxygen and high G-forces (e.g. pilots). Since Hochschild's (1984) ground-breaking work on emotional labour, there has been considerably more awareness that work may be extreme where its demands are not only physical but also intensely emotional.

Of course, another factor which has to be acknowledged in discussing the relationship between extreme and normal work is that conditions or tasks which are perceived as 'extreme' by one individual are not necessarily so for others. For example, being a slaughter-house worker would not be something many people could (let alone want to) do (Ackroyd and Crowdy, 1990). Different people have different levels of physical, mental and emotional tolerance for different jobs. Heat or G-forces or stress are experienced differently by individuals, as well, of course, as being managed differently in different organisational contexts (which itself has an influence on how individuals experience these situations or conditions). We will return to this point later when we consider how HETs extend these tolerances and abilities, facilitating a whole new perspective on 'fitting the worker to the job'.

### *HETs and the Renegotiation of the 'Extreme' and the 'Normal'*

Much discussion of enhancement in the media focuses on a future-orientated fantasy about how scientific progress will produce unlimited human potential. For example, one media account of the Academy of Medical Sciences report was entitled "How Smart Drugs and Cybernetics Could Create A Superhuman Workforce" (Louv, 2012, see also *Financial Times* 2012). However, it is important to recognize that various pharmacological and other chemical agents have been used in the past and still figure in the present. Accordingly, it is illuminating to consider the historical usage of stimulants in the military, as it provides a clear example of how the use of pharmaceutical technologies moves from 'extreme' occupations and situations into civilian or 'normal' areas of work and life. Although the military sanctions the use of pharmaceutical agents in an organized, top-down manner, usage practices 'on the ground' and the take-up of these substances within the civilian population are much less predictable and amenable to management.

During the Second World War states such as Germany, Great Britain, Japan, United States and the USSR, enacted measures in support of their war efforts that impacted civilians as well as military personnel. The stimulant methamphetamine was supplied to German and Japanese forces during the war in order to enhance their performance. The British and US military too investigated and deployed the use of amphetamine in combat, principally for its morale boosting properties and in spite of accumulating evidence regarding the potential deleterious effects (Rasmussen, 2008). In Japan, methamphetamine was not only used by the military but also explicitly made available "to improve productivity of civilian factory workers in military support industries" (Anglin et al 2000:138), "sometimes by coercion" (Iversen 2008:107). Having been dispensed in hospitals since the 1930s for the treatment of a variety of conditions including asthma, as well as used by students for studying at night, methamphetamine was subsequently produced on a large scale for military and industrial purposes following Japan's entry into the war. The abuse of amphetamines in the context of work remains a problem today in several countries.<sup>5</sup> For example, among many media accounts *HR Magazine*, the official publication of the Society for Human Resource Management in the US, carried an editorial (Fox, 2005) and report (Ladika, 2005) highlighting the problem of methamphetamine abuse among white collar professionals, with "stressed-out, overcommitted employees in high-pressure jobs ... increasingly turning to it for a boost" (Fox, 2005:12).<sup>6</sup>

Through this very brief overview of the use/abuse of amphetamines in the context of the military and civilian life, the porosity of the boundaries between 'extreme' and 'normal' can be clearly seen. Of course, it can be argued that when a country is at war necessity dictates that differentiations between extreme and normal are generally suspended. Nevertheless, we argue that it is pertinent to understanding the current relationship between HETs and employment, to recognise how enhancement technologies which are deliberately promoted within 'extreme' occupations also find a place in 'civilian' occupations and populations, and that the diffusion dovetails into the existing power relations of employment and facilitates the possibilities of working ever more intensively.

### *The development of 'working extremely'*

Thus far we have predominantly talked of 'extreme work' as particular sorts of occupations or conditions, but what has come to the fore in discussions of contemporary employment is the notion of how some work is itself becoming more 'extreme' in various ways, for example jobs which involve an intensive amount of working time (e.g. Tischler 2005; Hewlett and Luce 2006). In themselves they may not be extreme in task or environment, but are extreme in terms of the length of time they are carried out, which of course can have consequences for the employees engaged in this work. Patterson (2001:84) notes in relation to intensification of work that the 'working week' has been replaced by the 'waking week', as employment encroaches on non-work time and space.

Work intensification has been much discussed as a characteristic of contemporary western workplaces (e.g. Burchall et al 2002; Green 2001; Patterson 2001). It is seen as a consequence of macro-level pressures from the economy, competition, changing technologies and so on, but also from changes in organisational practices such as functional flexibility, downsizing and contractual forms such as zero-hours contracts. Intensification can additionally be shown to relate to changing HR practices, either directly produced by techniques that are designed to stimulate effort e.g. Performance Related Pay, or indirectly through commitment policies (de Menezes and Wood 2006; Green 2004). Intensification can be seen as an extension of the effort that employees put into their work. Green (2001) distinguishes between 'extensive' effort, which involves the increase in the time spent working, and 'intensive' effort where employees increase the amount of physical, mental and emotional labour they put into their work. It is important to see intensification as not just about the effort required for the immediate work tasks, but also that involved in the emotional labour and the need to 'perform' a successful organisational identity in order to be perceived as a 'good' employee in today's competitive work arena. Intensification is recognised as having detrimental effects on employees (Burchall et al 2002:72).

Within this culture there is a contemporary trend for 'normal' jobs to be carried out in more 'extreme' ways, and alongside this a growing interest in the ways in which enhancement technologies could facilitate or ameliorate this intensity. Again, there is a transference of technologies and research from 'extreme' occupations, especially the military, to 'normal' occupations that are being carried out in more extreme ways. A key example of this is the drug modafinil that we have referred to above. Modafinil has been used for the treatment of clinical sleep disorders such as narcolepsy, but simultaneously has been investigated for use in prolonged military missions. For example, it was used by French troops during 'Operation Desert Storm' in the First Gulf War (1990-1) (Sample, 2004). Unlike amphetamines, modafinil is seen as having fewer undesirable side-effects. Physical fatigue produced by sleep deprivation has been shown to significantly impair cognitive performance, even though those affected are often unaware themselves of these effects. Whether one is considering 'extreme work' such as military operations, or 'normal' occupations such as knowledge work, this may have important consequences for tasks and decisions undertaken under these conditions (Barnes and Van Dyne, 2009). Thus the possibility of enhancers such as modafinil for such situations may appear very attractive.

Indeed, discussions and evaluations of pharmacological drugs and other substances (nutraceuticals, functional energy drinks and other ergogenic agents) are already fairly

widespread. For example, in their study of the efficacy of modafinil for sleep-deprived personnel, Caldwell et al (2000:272)<sup>7</sup> extend the frame of reference from the military to emergency workers, those who also “frequently confront situations in which they must perform for extended periods without adequate recovery sleep”. Both the military and emergency work are occupations which are not only seen as extreme, but are typically presented as heroic in the media, and thus there is an elision between the perceived necessity of these jobs and the necessity of enhancement to facilitate their execution that comes to seem socially desirable. Here taking enhancement drugs might be seen as legitimate, as an indication of commitment and dedication to a worthwhile vocation.

Caldwell et al.’s investigation involved the performance of helicopter pilots on a simulator but the implications of their findings are seen to have more general relevance. “modafinil holds promise for its alerting effects... subsequent research is warranted to establish the best dosage level to be used for sustaining the real-world performance of sleep-deprived personnel” (Caldwell et al. 2000:281).

In the context of the growing intensification of work across occupations, issues of overload and worker fatigue, both physical and emotional (Gaines and Jermier, 1983; Cropanzo et al, 2003; Caldwell et al, 2004), are also problems for which these drugs are being presented as solutions. For example, ‘Shift Work Sleep Disorder’ has become recognised as a consequence of shift work, where individuals experience the disruption of their circadian rhythms through intense insomnia or sleepiness. The consequences for the individual have been related to increased likelihood of cancer, heart disease, and digestive problems (Straif et al 2007). For the organisation, there are increased risks of accidents, mistakes, absenteeism and irritability or mood swings among employees. Existing treatments include light therapy, melatonin, caffeine and sleeping tablets to improve sleep between shifts. More recently, modafinil has been investigated as a solution for shift workers, improving their wakefulness and performance during shifts (Czeisler et al 2005). It is available on prescription in the US and UK as a counter to some of the deleterious effects of shift work.

Studies have shown that workers do not necessarily stop working when they experience overload, but adopt various strategies to deal with it. These can include various short cuts, such as using familiar routines, delegating to others and imitating others (Hambrick et al, 2005), but the pursuit of riskier options is also observed. As Barnes and Van Dyne (2009) suggest, this includes more extreme behaviours and untested approaches. On an individual level, various technologies, particularly drugs, are already used informally to ‘enhance’ extension of working hours, concentration or enthusiasm (cocaine, amphetamine/speed, Ritalin etc.). It is within this context that enhancements are likely to be increasingly utilised in order to continue working without experiencing breakdown and burnout.<sup>8</sup>

#### *The re-negotiation and normalization of ‘extreme’ behaviours*

With the growth of a culture of ‘working extremely’, the boundaries between what is seen as ‘normal’ enhancement activities e.g. drinking coffee, and what would have been seen as ‘pathological’ or ‘asocial’ activities such as drug-taking, are re-negotiated. For example, drug-taking has been predominantly seen as a ‘problem’ for the organisation and management, with testing regimes and technologies and disciplinary policies devised in



order to control and eliminate what is seen as deviant behaviour (Warren and Wray-Bliss 2009). Drug-taking is prevalently linked with leisure, and therefore external to employment. Some ambivalence about employee drug testing noted by Warren and Wray-Bliss comes from an acceptance of employees having lives outside employment and a wider cultural acceptance of 'recreational' drug use, only seeing it as a problem where it 'spills over' into work time or ability to do one's job. However, the prospect of HETs changes these discourses around drug use considerably.<sup>9</sup>

One such example of this changing discourse is the discussion around the use of drugs such as modafinil within the transportation sector. Alertness is clearly a matter of concern in the civilian transportation sector, especially perhaps for long distance lorry drivers (Desmond and Matthews 1997). Thus the Transportation Research Board in the United States has sought to evaluate the use of stimulants and other psychoactive chemicals in relation to driver performance. Of course drugs, especially alcohol, have long been a matter of concern within this sector. Although the authorities and medical professionals involved in transportation have sought to put in place the means of prohibiting or at least constraining, managing and regulating drivers' consumption of drugs – whether illicit, licit, or on prescription – what is different about enhancement technologies is that their *positive* potential is being placed to the fore:

“Of the ‘newer chemical stimulants’ being identified, modafinil (and chemically related compounds) may offer the most significant potential as an efficacious and safe chemical countermeasure to fatigue and could be of assistance to commercial drivers (even for chronic use) in the quest for alertness management in highway driving” (Krueger and Leaman, 2011:30).

Such drugs might be allowed, or even promoted, as long as their use is *regulated*. Interestingly, in this area (as with surgery) risk is an important aspect of the evaluation: the safety of the driver, other road users, as well as passengers (when considering public transport) becomes a factor in support of enhancement. Likewise, the Academy of Medical Sciences report also acknowledges the *moral* dimension:

“there would be pressure to permit, encourage or even obligate the use of enhancements if they could be shown to increase the safety of others, for example in the context of medical practitioners or transport workers” (Academy of Medical Sciences, 2012:54).

Also notable in the US Transportation Research Board study is how the problem of alertness is constituted as one of “alertness management” (Krueger and Leaman, 2011:30). In other words, the need for alertness is a requirement of the job but is subject to deterioration due to working conditions (e.g. long journeys). Managing this problem is cast in a different light should “safe chemical countermeasure[s]” become sanctioned. Of course there is an obvious tension here insofar as the recent history has been one aimed at the securing of safety through an official sanction against drugs; whereas the dawn of the era of enhancement calls forth an imaginary of improved safety precisely through the administration of drugs. Indeed, the safety of the enhancers is tied to the regime of regulation in the absence of which the ‘safe’ might undoubtedly become ‘unsafe’. Even though some of the potential agents such as modafinil have been known and studied for

quite some time (Moreno, 2006), their legitimate use depends on organisation. In short, what may appear as simply a tablet to be swallowed is, when deployed within the theatre of war, surgery or transportation, a potent drug that has to be positioned and administered within a carefully stipulated management regime in order to optimise performance in relation to a given objective and to minimise potential risks and side-effects (Baranski et al 1998). Of course what might happen in practice, particularly given the actual demands and stresses of deployment is another matter; indeed, in the context of the military there are certainly several sources indicating a substantive disparity between prescription and actual consumption behaviour (e.g. Russo, 2007).

To recap the argument so far: the growing interest in and use of enhancement technologies is related to the contemporary trend for 'normal' jobs to be carried out in more 'extreme' ways: we would distinguish this from 'extreme work' by describing it as 'working extremely'. Along with the normalisation of this 'working extremely' (McCann et al 2008), the discourses around HETs are changing from the immoral and illegal associations of drug-use towards the moral discourses of safety and reduction of risk. These are inserted into rhetoric around the regulated and organised use of drugs such as modafinil, linked to a 'scientific' approach that aims to measure and determine 'safe' and 'effective' – i.e. managed - use. In these ways the lines between 'extreme' and 'normal' in relation to working practices and enhancement technologies are shown to be porous and dynamic.

### **Beyond the norm: From the 'normal' worker to the 'extreme worker'**

In this section we consider the ways in which developments in human enhancement technologies prefigure the potential transition from 'extreme work' to 'extreme worker', the subject position, so to speak, of the person who is enabled to 'work extremely' due to the technologically assisted modification of the body. In order to set the scene for this part of the discussion we first turn to the history of management to briefly consider a longstanding problematic regarding management and the organisation of labour. Since the emergence of modern industry in the early twentieth century a persistent theme facing management has revolved around the issue of 'fitting' workers to work in order to try and maximise output/efficiency (Hollway, 1991). If Taylor's pursuit of scientific management sought the one best way of doing a job, the subsequent rise of personnel selection aimed to match the individual worker to the demands of the work to be carried out. The problematic of fitting workers to work can be thought of as a top-down operation of sorting, of filtering prospective employees to achieve a match between job and worker. Some jobs require skill and dexterity, perhaps a degree of abstract knowledge or a good memory; yet others demand sheer brawn and endurance in the face of hostile working environments; and so on. Current and projected developments in human enhancement technologies (HET) augur both a dramatic revision of the problematic of fitting workers to work and a re-shaping of the boundaries of 'normal' and 'extreme' work. Enhancement technologies in the specific context of work can be understood as a matter of modifying the body so as to enable a correspondence between its capabilities and the demands of the task at hand. In other words, through enhancement technologies workers can be fitted to more extreme jobs. But also the definition of what constitutes the 'normal' (or otherwise) worker is also subject to modification. Writing of the military adoption of pharmacological enhancement, Bower and Phelan (2003:18) make a distinction between the 'maintenance' and the 'enhancement' of performance: the former being about restoring "a degree of ability that has been

degraded”, whereas the latter is about “improving the achievements of individuals functioning at their maximum capacity”. In line with the argument above about the categories of ‘normal’ and ‘extreme’, if we consider individual variability we might say that one person’s enhancement is another’s maintenance. What underlies this distinction between maintenance and enhancement is the assumption of a ‘normal’ individual (able-bodied and ‘fit’). This is also the ‘norm’ which underpins the approach of ‘fitting the worker to the job’: which assumes a normal distribution of abilities and aptitudes and that these can be measured and related to the job an individual can do. Thus, within a range there is a construction of what constitutes a ‘normal worker’.<sup>10</sup> Outside this range, individuals are excluded from particular jobs or from paid employment entirely.

This normalisation of the worker can also be fine-tuned to the individual level where the demands of a job require it. Thus, fighter and civilian pilots have their physiological abilities constantly tested and monitored (Civil Aviation Authority, 2012). The significance of the military as a key arena for discussions of cognitive enhancement can be appreciated as warfare and the preparation for warfare represent a domain in which managing the ‘fit’ between operatives and tasks has become amongst the most highly developed. It is something that is becoming ever more pressing given the growing sophistication of weapons systems that demand increased and prolonged levels of alertness, target discrimination and decision making capacity on the part of the human components of the systems (Jones et al, 1995).

Enhancement technologies allow for an extension of the ‘fitting of the worker to the job’, as it potentially expands the pool of labour pertaining to a given job by extending the capabilities of those (including people with disabilities) otherwise deemed below the stipulated requirements:

“Enhancement could enable more people to work at their full biological capacity and to meet necessary entry requirements for an occupation, which could result in a rise in standards or potentially greater opportunity and diversity at work. Individuals with lower cognitive abilities tend to have less choice of occupations. But enhancement may enable them to compete and thus have greater choice” (Academy of Medical Sciences, 2012:44).

In addition, as discussed, enhancement technologies suggest the possibility of working more extremely – including physical or mental endurance, concentration span, and other forms of performance – on a routine basis. Where once the measurement of employees’ abilities and characteristics around a norm informed management’s efforts to match individuals to a set of tasks required for the efficient functioning of the organisation, the possibilities of human enhancement technologies open the prospect of the active shaping of the body and mind of the worker to achieve not only a ‘perfect’ match to the task at hand but to go well *beyond the norm*.

Thus far our emphasis has been on the traditional view of employment, whereby hierarchical relations imply that HETs would be deployed as another technique in the managerial arsenal. However, it is important to look at this from the point of view of employee choice, agency and subjectivity as well. In other words, under what conditions do employees ‘choose’ to adopt enhancement technologies where there is no managerial

compulsion to do so? Employees themselves may elect to use HETs in order to gain employment or maximise their advantages within their career. Employees may view the use of HETs as an opportunity to close the gap between the demands of a job and their individual capabilities, or as a chance to compete better against others.<sup>11</sup> This leads us to propose that not only do HETs allow the intensification of 'working extremely', but they also provide the conditions for the potential subjectification and normalization of 'extreme workers': those who 'choose' enhancements in order to be able to perform better.

Recent debates about 'working extremely' have included an element which does not fit easily with traditional views of the employment relationship: the recognition that some employees actively embrace intensification. Hewlett and Luce (2006:49) have described this as the "allure of the 70 hour week". Tischler (2005) describes the experience of these jobs as having the same effect on people as extreme sports: the adrenaline rush. Of a bond-trader she says: "Indeed, there's an addictive quality to her work that has rewired her body. There are no broken bones, but Tse says she hasn't slept through the night in years, typically getting up two or three times to check on global market activity. 'Through time, your body clock just wakes up when London opens,' she says" (2005:56). As Hewlett and Luce (2006) argue, there is a strong impetus for professionals to see their extreme working as a heroic choice, a badge of honour, rather than due to the conditions of employment. This is not just the case for high-flying executives, but also for emotionally charged jobs such as emergency paramedics. Palmer (1983) describes the effect of the ups and downs of their work as a "milieu of excitement, danger, and public attention" which produces them as "trauma junkies". The ways in which this 'normalised intensity' has become described draws on the notion of being addicted to the adrenalin rush, as in Hewlett and Luce's description of it as "the American Dream on steroids" (2006:51). In this context, HETs can provide greater opportunities for extreme workers to achieve the demands of their jobs. For example, there are regular media accounts of executives (and academics) who will use enhancement drugs to counteract the effects of jet lag so they can continue to work at a high level without rest.

### ***Working beyond the norm***

What this discussion implies is that the tradition of 'fitting the worker to the job' takes on a new dimension with the possibilities of enhancement technologies. Since HETs open a vista for the capabilities of the worker to go *beyond* the norm, this connects with the broader managerialist search to extend the human resourcefulness and potential of the worker (Costea et al 2007; Ekman 2012). In other words, the 'normal' worker may become the 'extreme worker' in the sense that their capacity for work and their performance is extended through the use of these technologies.

'Fitting the worker to the job' was not the sole end of managerial techniques though. Hollway notes that work psychology from the human relations school onwards was "premised on the belief that the 'whole person' had to be engaged in the objectives of the organisation" (1991:11). More recent developments of HRM have reinforced this principle, and more and more of the 'whole person' has been expected to be brought within the employment relationship. This has consequences for the motivation and commitment expected of the employee, who is not only expected to do their job well but to demonstrate their identification with the goals of the organisation and willingness to 'go the extra mile'. Employees themselves have also become a living, breathing part of the organisational brand. These changes within the employment relationship bring extra demands on the

employee in the form of performance of a cultural norm, and in the form of emotional and aesthetic labour. Key to all of this is the expectation that the employee will find their own self-fulfilment and identity from their career and organisational role – although there is plenty of scope for contradiction and conflicts within these competing demands on the employee's subjectivity.

Within the managerial task of harnessing the worker to the goals of the organisation, is the need for an 'ideology of work,' as Anthony has described it. He explains: "an ideology of work is redundant when the labour force can be conscripted or coerced at will. In conditions of a freer labour market an ideology has to be developed in order to recruit labour and then in order to motivate it by persuading it that its tasks are necessary or noble. In conditions of a free market and a chronic shortage of labour, the manufacture and communication of an ideology of work becomes a central preoccupation of society" (1977:22). The current trend in the ideology of work is a set of discourses which emphasise individuality, choice and freedom, with the individual worker finding their self-fulfilment within their work and career. Rose writes of this: "work itself could become the privileged space for the satisfaction of the social needs of individuals. In the psychologies of self-actualization, work is no longer necessarily a constraint upon the freedom of the individual to fulfil his or her potential through the strivings of the psychic economy for autonomy, creativity and responsibility. Work is an essential element in the path to self-fulfilment" (1999:119).

Although this can inevitably only be a realistic proposition for certain jobs within the labour market, the ideas and values embedded in these discourses have broader effects than this. One upshot has been to incorporate elements of the culture of consumption within the employment relationship (Dale, 2012; du Gay, 1996) and the marketization of the worker themselves. As a consequence we have witnessed an individualisation of the employment relationship and concurrent reduction in collective relations around working conditions, with the onus on the individual to develop and market themselves as an employable asset. It is in this context that enhancement technologies are growing in use. The report from the Academy of Medical Sciences warns of the possibility for employers to coerce employees into the use of HETs. Accepting that, there needs to be further recognition that the context within which contemporary employment takes place means that there is fertile ground for employees to themselves 'choose' to take up these technologies in order to enhance their own individual performance, whether to successfully compete or defensively survive better in the workplace. Enhancement technologies may prove to be a new way for individuals to work on their own 'project of self' (Grey, 1988).

Costea et al (2007:250) point to the stress on 'performance' in the contemporary workplace. They argue that it has become intrinsically bound up with the drive for excellence, which is seen not only at the level of the organisation itself, but as a key goal for the individual: "It makes manifest, in discourse and practice, the postulate that the working subject is always capable of 'more', of 'becoming better', of learning, creativity, knowledge and 'talent' beyond that which is currently performed".

The individualistic self-improvement attitude which underpins this ideology of work is affirmed within a document from the DEMOS think-tank: "We all have a desire for self-improvement. Whether through education, work, parenthood or adhering to religious or

ethical codes, each of us seeks to become a 'better human' in a variety of ways" (Miller and Wilsdon, 2006:14). Here is an acceptance of the principle of working on the self for improvement, a discourse which allows enhancement technologies to be normalised as part of this 'natural' tendency. It is a discourse which is also picked up by those who have most to gain economically from this promotion of HETs to 'normal' individuals: the pharmaceutical companies. Hence we find Pfizer stating that its mission is dedicated "to humanity's quest for longer, healthier, happier lives" (in Rose 2007:215). This neatly side-steps the organisational goal of maximising profit, presenting it rather as an assistant to the natural impulses of humans to improve themselves.

Thus there is a confluence of forces which shape the use of enhancement technologies for improving work performance and going beyond the norm. On the one hand we have a growing acceptance of the possibilities of modifying the human through enhancement technologies and the assumption that these changes are in the hands of the individual who 'chooses' whether to adopt these or not. This links to broader debates about the ways in which life itself has become a source of value (including economic value). It also connects with the increases in "somatic subjectification" (Rose 2007:83) which has been seen in the workplace, whereby individuals shape their relation to work through working on themselves because of the requirements of emotional and aesthetic labour; the 'branding' of the employee as part of the identity of the organisation; and the use of open plan spaces in which employees are expected to 'perform' the appropriate organisational role. On the other hand, we have prevalent forms of subjectivity centred on notions of choice, freedom and responsibility. Increasingly employees are expected to take responsibility for their own well-being at work, their fitness and their employability (Dale and Burrell 2013). This attitude is also conveyed in the debates of those in favour of human enhancement technologies, for example Life Enhancement Products Inc.: "Let people be free to choose to be smarter and to take whatever steps are necessary. Be proud that your interests have led you to this pro-cognitive conclusion" (in Rose 2007:103).

HETs, then, can be seen as part of an individualised ideology of work which enables workers and organisations to see the possibility of going beyond the norm and thus facilitates and reinforces the increase and normalisation of 'working extremely'. The use of HETs within this context of 'working extremely' literally internalises and embodies this ideology of work, making it appear as an individual choice rather than as a managerial control strategy, pressure from peers or the labour market.

## **Conclusions and Implications**

If we understand technologies as innovations offering solutions to the problems that a culture poses for itself then perhaps it is not surprising that the possibility of "limitless malleability" betokened by HETs reverberates with so many aspects of contemporary work: from the increasing demands for labour flexibility and productivity due to changing socio-economic conditions including globalisation, to the impacts on the conditions of employment imposed by life in a '24/7' society; from the need to compete in the labour market of the so-called knowledge economy, to the increasing emphasis on entrepreneurial spirit, individual self-reliance and self-improvement. Thus HETs might seem very attractive to commercial and managerial interests seeking greater commitment and productivity as well as proving seductive for individuals in pursuit of better employment prospects and life

chances, or who simply need to cope with the rigours of their daily working environment. Furthermore, in a society whose population age structure is rapidly shifting towards the elderly, albeit at a time when people will have to work for longer in order to reach the official age of retirement, the prospect of HETs might seem particularly fortuitous. And in an era which rightly demands inclusivity, enhancement technology might seem to offer a greater proportion of disabled people access to the employment market.

In light of the social imaginary that mediates and reinforces discussion of HETs, it is important to restate that this paper does not seek to make predictions about the future, either to reproduce or puncture the hyperbole evident in much of the reporting of HETs. Rather, our focus is very much on recent and on-going examples of research on HETs, specifically those regarding the pharmacological modification of the body, and the particular problematisations of work regimes/environments for which HETs are promoted as putative solutions. Taking the Academy of Medical Sciences report on *Human Enhancement and the Future of Work* as a touchstone of discussion in the area, our concern is that despite the acknowledgement of the questions of risk that pertain to such technologies, as well as the need to avoid coercion in the workplace, there is nonetheless a striking disregard for the actual realities of work and working that are experienced all too often by countless employees in many industries, including intensification in all its forms (e.g. Burke and Cooper 2008; Kelliher 2010; Maume and Purcell 2007). The report gives expression to many of the fantasies of scientists and entrepreneurs about the possibilities that enhancement technologies have for changing the face of human work but there is rather less space devoted to the warnings of social scientists about the ways in which enhancements might strengthen or indeed spread exploitative conditions of employment. Where there are warnings about the use and abuse of enhancement technologies, the assumption is that regulation is the way forward. But what we hope to have shown in this paper is that this would be a very limited approach to understanding the relationship between HETs and employment relations. Thus discussions regarding enhancement technologies and work tend to ignore the cultural norms around work. The individualising of work and prevalence of discourses of self-fulfilment and choice around work and career mean that the use of these technologies is not just about the imposition of expectations from higher management, but is linked to individual decisions about whether employees see enhancement as giving themselves opportunities that they would not otherwise have, or enabling them to survive or prolong particular working conditions.

Moreover, in its orientation toward the future the Academy report eschews any in-depth consideration of the current context of work within which candidate drugs for enhancement such as modafinil are already being used, officially or unofficially. Nor does it take into account the ways in which HETs allow the reworking of norms around work, and indeed facilitate the trend of 'working extremely' by providing what initially are seen as extreme solutions but which over time become more acceptable for wider use. The porous nature of the relations between normal and extreme, both in work itself and in the discussions of the uses of enhancement technologies, means that there is a definite movement from their testing and use in 'extreme work' to their adoption within 'normal' work which can therefore be carried out in more 'extreme' ways - thus "normalising intensity" (McCann et al 2008). Although the use of pharmacological agents by the military may come as no surprise, the spread of the knowledge gained to sectors outside the military - for instance, the advent of drugs to tackle commercial/public sector aviator or driver

fatigue, or to allow surgeons to undertake long operations - might seem to present something of a quite different order, but constituted as a contribution to public/patient safety these start to become thinkable. Further down the slippery slope lies the prospect of their overt or prescribed use among other general categories of employment, such as shift workers. An obvious danger here is that the technology appears as a fix, a sticking plaster that diverts attention away from the persistence or even spread of “intolerable working environments” (Academy of Medical Sciences 2012:45).

There are a number of aspects of this we have not had space to discuss here, but which merit further consideration. These include the interests of ‘Big Pharma’<sup>12</sup> which remains in perennial need of new revenue streams and stands to obtain lucrative returns should cognition enhancing drugs secure regulatory approval and widespread acceptability. As historical examples of the use of stimulants such as methamphetamine show, society’s mores regarding the use of ‘drugs’ in the workplace may prove far from static. But whatever the official line, we can expect that there will be a continued unofficial trade in an increasing gamut of pharmacological aids that purport to ameliorate the demands of work in the Twenty-First Century.

If discussion of human enhancement technologies in the workplace appears radical in relation to the body it is nonetheless somewhat conservative when it comes to existing social arrangements, employment relationships and the current ideology of work. Should enhancement technologies be proffered as the ‘solution’ to extreme work (facilitated by the elision between ‘extreme jobs’ and ‘working extremely’), then other possible alternatives to “normalised intensity” (McCann et al 2008) will not be explored. But technology is not a given, it is subject to interpretive flexibility and so it is incumbent on management and organisation studies researchers to highlight and inform debate on human enhancement in the context of work to ensure that alternatives are opened up for consideration.

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## Notes

<sup>1</sup> Narcoleptics fall asleep at inappropriate moments. Although not a cure, drugs such as modafinil address the symptoms through stimulation of the central nervous system.

<sup>2</sup> There is some, admittedly patchy, evidence to suggest that the take-up of drugs with a potential for cognitive enhancement is already commonplace among certain sections of society (Los Angeles Times, 2007; Guardian, 2009; Sahakian, 2011).

<sup>3</sup> Of course one could argue that any use of technology represents a form of enhancement, that we are all 'cyborgs' and always have been right from humankind's earliest use of tools (e.g. Haraway, 1991). Whilst acknowledging this we would contend that enhancements involving the invasive modification of the human body for purposes that are not connected to treating disease, to repair or restoration in relation to some accepted norm, merit informed scrutiny and debate concerning the potential risks and benefits; particularly where elements of coercion may be present.

<sup>4</sup> The workshop was jointly held between the Academy of Medical Sciences, the Royal Society, the British Academy and the Royal Academy of Engineering. It invited contributions from a wide range of scientists and academics, from those working on the development of enhancement technologies to social scientists, as well as representatives from the enhancement industry.

<sup>5</sup> It has been reported that in the current civil war in Syria a variety of amphetamine – captagon – is both a source of revenue for some of the warring factions as well as a supplement to the spirits of some combatants and civilians (The Guardian, 2014).

<sup>6</sup> It is also worth noting that amphetamines found official deployment in the form of diet pills and treatments for hyperactivity disorders in children (Rasmussen, 2008).

<sup>7</sup> It should be noted that the research on both the effects of fatigue and on enhancement technologies overlaps between military and management publications, often by researchers working across the fields.

<sup>8</sup> For some employees, resorting to prescription medicines is a matter of everyday coping and adaptation.

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<sup>9</sup> There is of course a parallel debate about technologically assisted enhancement in sport and the boundary between the legitimate and the non-legitimate is blurred (for one ethical position see: Sandel, 2004).

<sup>10</sup> Another aspect of the 'normal worker', as constructed within the neo-liberal laissez faire market approach to employment, is what we might describe as the unencumbered worker: the 'ideal worker' is assumed to be, as Beck puts it, single, childless, fully able to fit in with the requirements of the market (1991:184), and indeed to make themselves marketable and employable. It is within this context that we can talk about not only the intensification of work, but "the intensification of everyday life," (Nolan, 2002:112).

<sup>11</sup> In relation to disabled employees, as the Academy of Medical Sciences report (2012: 46) acknowledges these changes in individualism and subjectivity might initiate a shift away from a social model of disability towards one which placed emphasis on the responsibility of individuals.

<sup>12</sup> "The big score: treating the 76 million middle-aged people who aren't demented but may welcome a way to reverse the frustrating forgetfulness that comes with age. 'People in the industry are thinking about it. It would be a huge market, but the drugs would have to be very safe,' says Paul Herrling, Novartis' research chief. James McGaugh, a neuroscientist at the University of California, Irvine, adds: 'Drug companies won't tell you this, but they are really gunning for the market of unimpaired people—the 44-year-old salesman trying to remember the names of his customers'" <http://www.forbes.com/global/2002/0204/060.html>.