Cyborgs-R-Us

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Abstract

The prospect of a merger of human beings and technologies to create cyborgs arouses great fear as well as great excitement. I argue that neither the fear nor the excitement is justified. The threat from cyborgization to human nature is non-existent, because there is a clear sense in which we are already cyborgs. Our great cognitive abilities are a product as much of the world, as we alter it, as of our unadorned brains. By the very same token, however, the excitement surrounding cyborgization is overblown: it is not a radical departure from our pre-existing mode of being, but an extension of it. Cyborgization presents us with many challenges and opportunities, but both the dangers and the benefits are of a familiar kind.

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1 Introduction

Should we fear the coming of the cyborgs? Many people have a visceral reaction against the idea that we might become part-machine. There are many reasons for this response, some of them quite powerful. But the major impetus behind the intuitive rejection of cyborgization is misguided. We fear cyborgization because we believe that it threatens human nature and human dignity: that it threatens to replace the living, autonomous, human being with a mere machine. But this fear is a symptom of a profound, and untenable, dualism, the division of the world into irreconcilable categories of minds and matter. This fear should be relegated to the dustbin of history, along with the dualism that motivates it.

That is the good news, at least for fans of cyborgization. There are two pieces of bad news. First, rejection of the argument from dignity does little or nothing to disarm the other, boringly familiar yet nevertheless serious, arguments against cyborgization, from concerns about distributive justice to worries about privacy and surveillance. Second, so far as we can tell from here, if the threat of cyborgization to human nature is less than we are often tempted to think, its distinctive promise is smaller too. No doubt a cyborg can be equipped with a range of tools which are useful – from built in links to the internet to limbs which are stronger and less susceptible to tiredness. But these tools could equally be carried or worn: there is little need to build them into the body. So cyborgization might turn out to be less exciting than we might think, on all fronts: it does not threaten human nature, the moral issues to which it gives rise are variants of familiar problems, and the resources it makes available do not require cyborgization.

2 Human Nature, Cyborg Nature.

We can tolerate, even welcome, technological additions to our body, but the cyborgization of the mind is deeply worrying to many people. To some extent at least, we regard our limbs and even our eyes as tools in any case (witness the remarkable speed with which prosthetic limbs are incorporated into someone's body schema, or, more surprisingly, the speed with which paralyzed limbs lose their place within the cortical representation of the body (Sacks 1993; Gallagher 1995)). But our attitude to our mind is crucially different. Our minds are not tools of ours, they are *us*. So technological additions to the mind are alterations, perhaps threats, to the self.

Fears of this kind go back a long way – at least to Plato. In the *Phaedrus*, Socrates recounts the story of the Egyptian god Theuth, who offered King Thamus a new mind technology – the gift of writing. Writing, Theuth claimed, was 'a recipe for memory and wisdom' (274e). But the wise king rejected the gift, saying that it offered only the semblance of wisdom without the substance, and threatened to destroy memory altogether, by making its exercise unnecessary. Writing will allow us to repeat wise words, without necessarily understanding them, and will cause the atrophy of our memories.

There seems to be two arguments against writing here, the first concerning wisdom, the second memory. The first worry is epistemological, in a very broad sense of that word. Writing will allow us to substitute the appearance of wisdom for its reality. I shall return to this worry in a later section. For the moment, I want to concentrate on the second worry.

As far as this second worry is concerned, Plato's thought seems to be this: if we allow new technologies to replace our native capacities, those capacities might soon be lost. A contemporary manifestation of the same worry is often heard concerning the use of calculators and spell-checkers. The worry is that excessive reliance on calculators or spell-checkers will cause our arithmetical or our spelling abilities to atrophy (or never develop at all). And that is a problem for several reasons (more plausibly with calculators than with spell-checkers): because developing and maintaining arithmetical abilities might be a part of general intelligence (and therefore a decline in such abilities might lead to reduced cognitive capacities in general), because calculators can fail

completely, leaving those who rely upon them at a loss, and because calculators can develop bugs, yielding wildly inaccurate answers which will not trigger alarm bells in those without a minimum of arithmetical ability.

We ought not deny that all three of these worries have some force. Calculators do sometimes malfunction or fail completely, and it might be true that arithmetical ability is a component of general intelligence. Against this, however, there are powerful arguments in favor of the extensive use of all the tools that technology can make available. To understand these arguments, we need to consider the picture of the mind which seems, implicitly, to underlie technophobia from Plato to today.

The view is emphatically dualist. On the one hand, we have the mind, with its innate or acquired capacities, and on the other we have technological add-ons. Adding mindware to the brain will either replace the seat of the self with a mere machine, or – if the machine is able to subserve a self – will transform it beyond recognition, into something no longer fully human. The problem with this view is that it is false. We cannot distinguish between the mind and its capacities, on the one hand, and its technological scaffolding on the other. Instead, the mind is already very importantly a product of technological scaffolding.

Here I follow Andy Clark (2003). Clark argues that our cognitive capacities are not native to the unadorned brain, but are instead the joint product of brain and world. The unadorned brain is just not all that impressive: it is the world of tools and props with which we surround ourselves which makes us so smart.

There are two possible ways to read this claim, one obviously true and rather banal, the other more interesting. The obviously true and banal claim is that human brains, like every feature of every organism, require the right kind of environment to develop properly. Obviously, brains don't develop properly if the organism does not receive adequate nutrition. Slightly more interestingly, though the capacity for language is certainly innate in human beings, this capacity is not developed unless the child is exposed to the appropriate range of stimuli at the appropriate time. If she is not exposed to a natural language early enough, her capacity for language will never develop properly, and as a consequence her ability to engage in those kinds of reasoning which require language will be seriously compromised. It is for this reason that deafness has been described as a preventable form of mental retardation (preventable by replacement of a spoken language with a signed language). The neural pathways which underlie our sophisticated cognitive capacities require the right stimuli to develop: that's one sense in which minds are joint products of world and brain.

This first claim is banal in the following sense: we can understand it essentially as the claim that for the brain to follow its optimal developmental path, for its innate abilities to develop, it must develop in the right environment. A new-born child is equipped with the universal grammar, which gives her the potential to learn any natural language. But the potential that is hers innately can only flower if she is exposed to a natural language. Nevertheless, the potential is innate.

But there is a second, much more interesting, to way to understand the claim that the world, as much or more than our brains, makes us smart. It is certainly true that an appropriate environment is necessary for us to develop our innate capacities. But it is also true, and this is the second way of understanding the claim, that our props and tools can give us abilities that cannot be understood as innate, in any interesting sense. We think with and through our tools, and these tools extend our minds, in a quite literal as well as a metaphorical sense.

We have been cyborgs, entities with minds that are, in part, prosthetic, at least since the beginning of culture. We have stored our memories outside of our brains ever since we have had writing; we have extended our mathematical abilities with tools ever since we first began to count on our fingers and we have incorporated prostheses into our body schema ever since our distant ancestors picked up a stick. We are most interested here in the ways in which technology expands cognitive capacities: think here of Arabic numerals, and the way in which they facilitate arithmetic. We can imagine the aged members of the Arabic societies in which long division was invented clucking their tongues and warning of the day when paper wasn't be available and the young people wouldn't be able to do their sums.

Clark provides a lovely example of the ways in which tools expand the cognitive capacities not just of human beings, but even of chimpanzees. Chimpanzees can use their unaided brains to distinguish between pairs of objects which are the same and those which are different. But only chimpanzees that have been taught to associate the concepts of 'sameness' and 'difference' with physical tokens can solve the higher-order task of sorting pairs of pairs of objects into those that are the same and those that are different. By using symbols, they transform a difficult higher-order task into the simple first-order task of judging the sameness or difference of symbols. In the same way, Clark suggests, language transforms our cognitive landscape, allowing us to perform the kind of tasks for which our brains are suited, and thereby to achieve results which would otherwise be beyond them. It may that we can perform higher-order sorting tasks for exactly the same reason as the trained chimpanzees: because we, like them, associate tokens with the concepts of sameness and difference and thereby transform a higher-order task (sorting pairs into pairs) into a first-order task (sorting tokens into pairs). The difference is that the chimpanzees use physical tokens, whereas we use words which we may or may not need to externalize, depending on the complexity of the task.

On this view, what distinguishes us, cognitively, from chimps is not just our innate abilities, but, very importantly, the degree to which our brains are able to enter into intimate relationships with nonbiological props. No doubt this is itself an ability that is innate in us, but it allows us to extend our minds in ways that could not be predicted in advance. We are, as Clark puts it, natural-born cyborgs. We shall not become cyborgs when new technologies add silicon and wiring to our brains: we

have been cyborgs – creatures who are only part flesh-and-blood, and whose abilities crucially depend upon the nonbiological – at least since we became speaking animals. As Clark points out, this has interesting consequences for the debate currently raging, between people like Francis Fukuyama (2002) and Gregory Stock (2002), over the extent to which we ought to embrace a 'posthuman' future. Adding implants to the brain, and making the world smart, is a not a new departure for homo sapiens, which will transform its nature. Instead, it is what we are best equipped to do, *by* our nature.

Ironically, the degree to which we are natural-born cyborgs, to which our cognitive capacities are already distributed in the world, is missed as much by the most enthusiastic proponents of cyborgization as by its foes. Kevin Warwick (2002), for instance, proclaims himself the world's first cyborg. He's out by about 100,000 years. This matters, not just because his claim for priority is wrong, but because his failure to grasp the extent to which our minds are already extended by prostheses results in a false picture of what we might hope for from cyborgization. For Warwick, the greatest promise from cybogization lies in its potential for communication. At the moment, we use a poor, error-prone and slow method of communication: language, which 'severely restricts our intellect, as all our thoughts and ideas have to be transformed into signals that do not always accurately represent the original concept' (2). Warwick suggests that our natural languages ought to be replaced by direct neural connections. This suggestions appears to buy into a strong and nativist version of the language of thought hypothesis. Moreover, it is a version of the LOTH which has some implausible commitments. The LOTH does not, by itself, commit us to holding that all concepts are innate. It is very likely that merely possessing a LOT is far from sufficient for a wide range of cognitive tasks. We need to develop that language, to clarify it to ourselves, and we do that in very important part by learning and using something very like a natural language. This language does not obscure the purity of our LOT, it helps to develop it. In any case, would we really gain anything, in terms of communication efficiency, by being able to link our streams of consciousness together? It's far from clear that there is a communicable content here at all. Warwick's view seems to be that our thought is too subtle for natural language; it may be instead that it is too confused and fragmentary until it is disciplined by translation into propositional form (whether those are the propositions of English or of the language of thought, which might well be very like a natural language).

Contra Warwick, it may be that rather than revealing the mind in all its purity, cyborgization extends and alters our cognitive capacities. Certainly Warwick ignores the immense increase in our cognitive abilities caused by the externalization of our thoughts, turning them into physical symbols that can be manipulated. If cyborgization refers to the use of tools and technology to enhance our minds, we do not have to wait for direct neural links for this transformation to take place. We have been cyborgs as long as we have been human.

Human beings just are a kind of animal which interfaces easily with the environment and which extends its mind outside its skull. Cyborgization more narrowly construed, the implantation of chips and sensors which allow us to extend our capabilities with new technologies, simply continues this process. It does not threaten our nature, but is of a piece with it.

3 The Bad News

The deep problem, the threat to our identity, turns out to be no problem at all. But that leaves a host of shallower problems, which are no less threatening for that. I won't dwell on the more obvious ethical problems, such as the questions of inequality and the threat to privacy, since they have already received a great deal of attention from others. However, it is worth mentioning one, less familiar, issue. It may be that increasing interaction with networked machines represents a threat to democracy and to tolerance. Cass Sunstein (2001) argues that new technologies will weaken the democratic polity because they encourage people only to communicate with like-minded individuals, and reduce the number of chance encounters which throw the disparate together and make them appreciate each other's problems. It may be that constant communication with like-minded individuals makes people come to regard as normal and acceptable views that are in fact extremely rare, and may be morally abhorrent. The example of pedophilia is the most obvious here.

This problem is not noticed by Clark. Instead, he celebrates the extent to which mobile phones already allow us to ignore the passengers with whom we share a subway car, while maintaining our chosen relationships instead, and to which software agents will increasingly tailor our environment to our tastes. Of course, if this is a serious problem, it is a problem with our new networked technologies, not with cyborgization (narrowly understood) per se. It is worth noting, moreover, that this is a problem that has been with us in some form ever since the invention of writing made it possible to communicate across long distances, and therefore enabled us to associate preferentially with people who were located far away.

Moreover, if the threat from cyborgization is overstated, so too is its promise. Think again of Plato's concern that writing would lead to the replacement of wisdom with the mere semblance of knowledge. Writing, he argued, can only serve to remind those who are already knowledgeable, not to teach those who are ignorant. For real learning, he argued, we need 'the living speech', which is 'written in the soul of the learner' (Phaedrus, 276a). But it is just obvious that this is false. Of course we can learn from writing; we do it all the time. Of course we can be misled by writing, we can fail to understand what we read. Equally we can be misled by speech.

So we oughtn't to make too much of Plato's objection. Still, it may be that something like Plato's knowledge argument ought to cause us to curb our enthusiasm for cyborgization. There is little immediate prospect that it

will offer us anything *qualitatively* different from the range of prostheses and tools already available to us.

Clark may be right that most of us tend to overplay the difference between our brains and the external props we use to think. But he seems to underplay – or more correctly, to fail to notice – the differences there are. An example of his makes this apparent. He asks us to consider the everyday experience of asking someone for the time. We might use the locution 'do you know the time?', and receive the answer, 'yes', even *before* the obliging stranger looks at her watch. Clark argues that we ought to take her response literally: she does know the time, since knowing how rapidly and effectively to retrieve information suffices for knowledge (on any plausible view, you count as knowing not only the thoughts you currently entertain, but also the dispositional knowledge you know how to retrieve). So technology can expand the range of what we know, and there is no interesting difference between the facts we recall from our biological memory and those we recall from our prostheses.

So far so good. Now Clark asks us to imagine a new technology, which would enable us instantly to access reference books (perhaps by having the words directly projected on our retinas). Someone asks you if you know the meaning of an unusual word. Shouldn't you answer 'yes', even as you look it up? Clark argues you should. But in so doing, he's ignoring a crucial difference between knowing the time and knowing the meaning of a word. Knowing a dictionary definition is neither necessary nor sufficient for knowing the meaning of a word, which is a skill best captured by our ability to use the word appropriately. It is not a mere fact, like the current time. But our skill-based capacities – of which Clark (1997) himself has made so much elsewhere – seem quite different, in kind, from anything of which our prostheses have so far been capable. Moreover, these skills seem to retain an essential link to the embodied mind. Knowledge is very importantly a matter of having certain skills, a matter of knowing how to manipulate concepts and seeing how they fit together. Having instant access to a large database of facts might be very nice, but its not going to transform our cognitive capacities in any fundamental way. Cyborgization will continue, the way it always has: we shall adapt ourselves to our tools, become familiar with them and incorporate them. Being a cyborg, in the narrow sense, will give us a new range of tools with which to play. These will open up new possibilities, I have no doubt. The sheer speed of the computing technology to which we shall link will no doubt transform our cognitive options in ways that are hard to imagine. But we shall interface with it as we always have: by exploring it and becoming familiar with it.

It's worth remarking, finally, that the very ease with which we merge with new technologies casts doubt on the need for us to become cyborgs, in the narrow sense. Why build an infra red visual system into your head, when you can just as easily carry a pair of binoculars which give you the same capacity? Why implant a memory chip, when your PDA can carry the information more simply and less invasively? Given the ease with which we incorporate tools into our body schema, there is no need to incorporate the technology into our bodies – to become cyborgs in the narrow sense – in order to reap what cognitive and instrumental benefits cyborgization has to offer. The Australian performance artist Stelarc often uses a third hand that is controlled by sensors on his abdomen and legs. Having used it for many years, Stelarc has been able to integrate it fully into his body schema. In order to use it, he no longer needs to think about flexing his stomach or leg muscles: he simply moves his third hand. He can use it for precision tasks like writing. We all have similar experiences, I suggest. We incorporate our cars into our body schemas, or our golf clubs, or our computer keyboards. The fact that we are not attached to these devices all the time does not prevent us from making the cyborg leap. Precisely because cyborgization comes easily to us, we do not need to engage in its flashier forms.

So cyborgization is not the radical departure from what has gone before that both its proponents and its detractors see in it. It does not represent a leap into a post human future. Instead, it is merely an extension of the kinds of relationships with the environment in which we have always engaged. It is neither as threatening, nor as exciting, as we might have thought. Nor is it entirely unproblematic. Instead, it confronts us with a very ancient set of challenges, in a guise as new as tomorrow.

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