Introduction: Animal, mechanical and me: Technologies that alter subjectivity

It is 1975, and I am 5 years old, waiting for my favourite TV programme to start. It is 'The Six Million Dollar Man' – an American TV series where the main character, Steve Austen (played by Lee Majors), undergoes surgery to repair and replace his limbs and organs with bionic prosthetics and cybernetic devices. The voice-over is saying these words: 'Gentlemen, we can rebuild him. We have the technology. We have the capability to make the world's first bionic man [sic]. Steve Austen will be that man. Better than he was before. Better. Stronger. Faster' (Voice-over to 'The Six Million Dollar Man', American TV Series, 1974–1978).

It is 2015, and I am interviewing Maggie, six weeks after she has had an implantable cardiac defibrillator (ICD) fitted in order to prevent her from having a sudden cardiac arrest (SCA). She shares with Steve Austen the fact that she too has to live a techno-organic hybrid life, allowing cybernetic systems to control some of her vital functions. Unlike Steve Austen, Maggie is not better, stronger or faster. This book is about individuals such as Maggie who are everyday cyborgs.

Introduction

In the UK, the present organ transplantation rate from deceased human donors does not meet the demand. This is a trend even in countries like Spain with comparatively high donation rates and an efficient procurement system. Improving transplantation rates by changes to the procurement system may be limited by the availability of living or deceased human donors. Organ transplantation has been and always will be a victim of its own success. The more successful transplantation procedures have become, the more

the actual number of organs that can be transplanted as well as a greater variety of organs that can be replaced. The shortage of deceased and living human donors is only likely to become more acute as the demand increases for a higher number and variety of human organs. Meeting the expansion of future needs for an ageing population suggests that attention must be given to alternative sources for organs as procurement systems such as opting-in or opting-out will not meet demand. To put it another way, more of us will require more in us.

Currently, highly experimental procedures such as xenotransplantation or 3-D bioprinting are touted as a means by which the persistent shortfall in human organs can be solved. For many years xenotransplantation has been heralded as having the potential to address the organ shortage. It involves taking organs from non-human animals and transplanting them into human recipients. At the moment pigs are generally preferred due to their organs being a comparable size to human organs, and allegedly raising fewer ethical concerns than using primates. However, despite using porcine valves to replace human heart structures, the replacement of entire human organs from non-human animals remains experimental and elusive. Xenotransplanted organs maintain their non-human animal cellular structure, which makes them liable to attack by the organ recipient's immune system. A more recent alternative is a proposal to 'regenerate organs'; these could be bioprinted from the cells of the recipient that requires them and this would make the donor the recipient and the recipient the donor. 3-D bioprinting works with organic materials (including living cells) from the individual to create structures approximating body parts (Vermeulen, Haddow, Seymour et al., 2017). Specialised printers use biological inks (bio-inks – such as differentiated stem cells, human embryonic stem cells or induced pluripotent stem cells to print layers of living materials one slice at a time, placing them on top of each other. It can avoid the challenges that xenotransplantation raises, for example, in terms of rejection and immunosuppression and associated ethical concerns with using non-human animals for transplantation.

Neither xenotransplantation nor 3-D bioprinting are successful alternative solutions for transplantation. Whereas xenotransplantation has been attempted in humans, it has proved largely unsuccessful and 3-D bioprinting of organs has yet to go to clinical trials.

I outline in more detail in Chapter 2 the challenges both have to overcome. I also offer some original research findings about how members of the public view a range of differing implantable biotechnologies to repair, replace or regenerate human body parts and the reasons for them.

Today human bodies are living in a society that is increasingly technologically mediated; people themselves are not just surrounded by information and communication technologies, but these are inserted within them (Hayles, 1995). '[W]hat is different in the 21st century about mechanical interventions is the scale on which devices are built and their coupling with electrical devices' as some highlight (Campbell, Clark, Loy et al., 2007: 231). Unlike the uptake of different *kinds* of organic materials that are living or deceased human or non-human animal, there are a range of different *types* of materials. Implantable medical technologies such as cochlear implants (CIs), deep brain stimulators (DBSs), in vivo biosensors (IVBs) and cardiac devices such as implantable cardiac devices (ICDs) and cardiac pacemakers (CPs) have features such as computational intelligence, autonomy and responsivity and can be defined as 'smart' (Haddow, Harmon and Gilman, 2016; Harmon, Haddow and Gilman, 2015). Viewed as the 'gold standard' in treatment of some heart conditions, ICDs are widely used in the UK and elsewhere. Most of the time, an ICD is dormant inside the body, only activating when it senses a heart arrhythmia (a fast heart beat). An ICD, will, for example, attempt to control heart beats and rhythms that are going too fast through a series of small electric shocks, called cardioversion. Failing cardioversion, an ICD will then produce a series of much stronger electric shocks, and it can go through this cycle several times until it has sensed a regular heart rate has been reinstated. The activity is stored as data and be communicated either in the clinic or from the individual's house, back to medical professionals based in the hospital. They are the 'informational stimulators communicating data about activity from the ICD within the person's body to hospital centres' (Bjorn and Markussen, 2013). Due to this ability, as well as being 'smart' insofar as it is an autonomous feedback function that detects a change in the body's cardiac environment, an ICD is a homeostatic closed feedback system. ICDs are a closed-loop feedback system and may be termed cybernetic, because of the

control-command-communication-intelligence (C3I) features they incorporate (Haraway, 1991). Inserting cybernetic devices (cyb) into human organisms (org) creates a cyborg yet causes new types of biomedical vulnerabilities and has implications for subjectivity that will be the focus of Chapter 4. Should xenotransplantation and 3-D bioprinting then become successful, and dependent on apparent need, individuals may look forward to living their lives assisted internally with various montages of materials from origins as diverse as other humans, non-human animals or biomechanical (such as bionic, robotic or cybernetic). This future new normal of hybrid bodies is not necessarily an imagined one; it is a prediction that is partly based on current practices such as human transplantation and implantable medical technologies and possible developments such as xenotransplantation and 3-D bioprinting.

It could be argued that an ever increasing reliance on such biomedical solutions that are expensive and fast is creating a 21st-century identity crisis in modern Western societies. The identity crisis is due to the numerous and diverse creation of human hybrids. This hybridity is driven by the need for human beings to do everything in their power to avoid their demise. Over time, and as individuals age, their bodies will increasingly become a collage of organs and devices used to repair the structure and function of their viscera. Individuals will be less than 100 per cent human as they increasingly become augmented by different types and kinds of materials. The ‘born body’ of a human being, will become the exception rather than the rule and the ‘techno-organic hybrid body’ the new norm. Alterations to the body’s integrity or, as I also refer to it, simply the ‘insides’ of the individual’s body, causing it to become a hybrid, will have consequences for identity. Body modifications, even in our inside bodies, can result in alterations in subjectivity and the subsequent identity changes will partly be determined by the type and kind of material that is used to repair, replace or regenerate the body. In this book, I will outline the possible scale of the 21st-century identity crisis, by addressing the following:¹

- 1 How do members of the public respond to hypothetical preferences for different *types* (mechanical) and *kinds* (non-human animal or human) of organs to repair the human body?

- 2 What are patient experiences of having undergone one type of body repair (such as implantable medical devices) and becoming an ‘everyday cyborg’?
- 3 Consider why bodily modifications alter subjectivity, especially to the inside of the human body, and whether it is dependent on the origin of organs and devices.
- 4 Finally, bring social science research into dialogue with bio-medical and philosophical understandings of the connection between persons and their bodies, reflecting on this relationship as a fluid and dynamic experience whereby embodiment is always ambiguous.

I will be drawing on various philosophical and sociological theories about the relationship that is experienced between identity and the body.

For example, there is a well-known philosophical thought experiment called ‘The Ship of Theseus’ which considers how much of an object can be changed before it is no longer the same object. In this philosophical example, it is how much of a ship needs to be replaced before it is no longer the same ship. This philosophical question, applied to human beings, might be phrased as ‘how much of a human being has to be replaced before that person is no longer the person they once were?’ For example, Williams argues that in creating the cyborg it is ‘best conceptualised on a continuum with the human organism at one end (i.e., the “all-human pole”) and the pure machine (automaton) or artificial intelligence (AI) device at the other’ (Featherstone and Burrows, cited in Williams, 1997: 1041). This depends on a view of the body as a quantitative sum of body parts, which is altered through the numerical addition of materiality. It is only the quantity that is important and not necessarily the quality. This leaves unexplored the question of what type of change might occur and with what artefacts. I want to answer this problem by tackling different but related questions such as 1) How does who we are relate to what we are? which therefore leads to 2) How does changing what we are affect who we are?

As well as reviewing empirical research that explores the narratives offered by organ transplant recipients, I will use findings from my research that I conducted with ICD patients, whom I will

come to refer to as ‘everyday cyborgs’ (for reasons outlined further below). I also conducted focus group and survey research with various members of the UK public, the findings of which demonstrate clear preferences for real and hypothetical transplants and implants. In this research, I explore whether and how alterations to a human body from another human, from non-human animal or from mechanical origin alters subjectivity via a potential compromise of the insides and the integrity of the human body. By exploring how using different types and kinds of materials from different sources can have varied consequences for personal identity, the extent of the identity crisis can be evaluated as well as the strategies that individuals use to overcome them. The reliance on a technological ‘fix’ (in terms of addiction and solution) in relying on such sociotechnical means to solve health problems creates new vulnerabilities, for example, adjusting to new organic-technological hybridity as well as allowing cybernetics to be in control of body functions.

Who are we?

Philosophically, the connection a person has with their body can be traced back to the thinking of René Descartes in the seventeenth century and his idea that the body is a machine separate from the person. The body in Cartesian Dualism, is similar to the way that an individual might own or possess a car. Repairing the car has no effects on the driver. Modern-day practices such as organ donation and biomechanical implantation with smart and cybernetic devices are dependent on this view of the individual, their body and its organs. This view of a split between mechanical body and mind is based on the French philosopher’s musings on the nature of knowledge. The result of his reflections was that the body is separated from the mind and the thinking self; Descartes’ process of cognition produces his famous quote ‘cogito, ergo sum’ (I think, therefore I am). This Cartesian thinking is central to medical practice and also appears to have gained broader social acceptance. As Burkitt also argues, ‘[I]n the Western world individuals have grown accustomed to a way of understanding themselves which divides their existence between the mind and the body’ (Burkitt, 1999: 7). Such a view of

the inside of the human body is arguably cemented by the use of imaging technologies such as X-rays, cameras and scopes that can probe and visualise inside human flesh. Helman argues that the imagery produced by such medical interventions is associated mainly with the idea of the body as a mechanical entity:²

The inside of the body is often conceived in the image of domestic plumbing coterminous with the view of the body as a machine. Many people think it is made up of a series of hollow cavities – called ‘chest’, ‘stomach’ or ‘bladder’ – connected with one another and with the orifices outside, by networks of piping or tubes. Diseases are seen as ‘blockages’ of one of these long soft tubes – an artery, a vein, a bronchus or a bowel. Such blocked tubes must be ‘washed out’ by laxatives, drugs or catheters, while the ‘furred-up’ arteries of the heart need to be regularly re-bored, or even ‘by-passed,’ by the mechanics of medical science.

(Helman, 1991: 88)

The self as the brain?

In modern society, the mind or self is now closely associated with the brain as the materiality of self-identity and thinking as the process of cognition (Vidal, 2009). Indeed, recent attention focuses on interoception highlighting how the self is a neurological construct and sensation (Craig, 2002). This reinforces the Cartesian understanding of the relationship the self has with the body; the self is housed in the brain which is a distinct entity from the body, which itself is an alienable property from the rest of the body.

In Chapter 1, ‘Ambiguous embodiment and organ transplantation’, I show how this mechanistic Cartesian view of the self as being separate from the body is challenged by the existence of narratives about subjectivity alteration, that accompanied the beginnings of human organ heart transplantation. These stories suggest that for some organ transplant recipients, a change in their identity occurs after receiving the donated organ. In reviewing and comparing much of the early and later qualitative research with organ transplant recipients, a persistent theme of subjectivity alteration emerges, regardless of what organ is transplanted. Research by the anthropologists Fox and Swazey in the early days of heart

transplantation, but also latterly in the work of Sharp (2006) and Shildrick (2015) with organ transplant recipients, demonstrates what is termed an ‘anthropomorphisation’ of the donated organ (Fox and Swazey, 1974, Fox and Swazey, 1992, Shildrick, 2014, Shildrick, 2015, Shildrick et al., 2009). Narratives emerging from interviews with organ donor recipients highlight common features such as a gender alteration or a feeling of youthfulness, but also inheriting behavioural and lifestyle preferences of the deceased donor, relating to music for example.

My intention is not to make claims about whether such stories are true or not; they are stories that are important to the individuals that share them and which have persisted from the beginnings of transplantation to the present day. Neither is it my desire to assess how many transplant recipients report them, as it is sufficient that such stories persist despite scepticism and alternative biomedical explanations. Rather I argue that these narratives from organ recipients are important because they bring into conversation the body and person, and a very different view of how a person experiences their body from the Cartesian Dualist one.

In his influential work *The Phenomenology of Perception*, written in 1945, Merleau-Ponty claims that we do not possess our bodies or are separate from them, as Descartes argues. We do not ‘have’ bodies, but we are our bodies (Merleau-Ponty, 2012). For Merleau-Ponty, a body is the sensory gate into and onto the physical world. It is both object and subject in a relationship of perception with the environment. All our experience of the world is therefore embodied. In the arguments of Merleau-Ponty, modifications to the body, either as a loss or addition, can alter subjectivity.³ Merleau-Ponty uses the example of an object such as a man’s cane or a woman’s feather in her hat, both ‘expresses the power we have of dilating our being in the world, or of altering our existence through incorporating new instruments’ (Merleau-Ponty, 2012: 145). Post-phenomenological perspectives, especially the work of Ihde, discuss our embodied relations with technology and the way that technology mediates the perception of the world (Ihde, 1990). Similarly, in his book *Natural Born Cyborgs*, author Andy Clark suggests that most humans were born to be cyborgs, not because of any traditional ‘physical wire-and-implant mergers, so much as on our openness to information-processing

mergers' (Clark, 2003: 6). Clark views tools, such as pens, papers, watches and so on as being 'mind-enhancing technologies' (Clark, 2003: 7). However, as Clark stresses, these technologies are not actual changes to the human body in the same way as an amputation or implanted devices are and therefore may not speak directly to the consequences for identity or subjectivity when integrity is breached and the inside of the body modified. The phenomenological 'embodiment as the (perceptual) experience' is important but I am arguing for something slightly different and that is how the *experience of embodiment* is altered by amputation, transplantation and implantation of technoscience.

Thus the relationship a person has with their body, generally referred to as the experience of embodiment, is ambiguous as a person both is a body (in terms of phenomenological understanding of 'I am a body') and has a body (in terms of a Cartesian Dualist understanding of 'I have a body'). The research and thinking offered in this book highlight that having or being a body, of embodiment, is not a static state, however, but a fluid experience. I suggest that the ambiguity is not just in terms of *whether* I am, or I have a body, but its fluidity is based on events that bring about questions of *when* I am, or I have a body. That moment occurs when events such as implantation and transplantation are acted upon the body, bringing the ambiguity of embodiment, to the forefront of the experience. This is not a new idea. The construction of identity is a process, for example, that is disrupted by illness (Charmaz, 1995) and also as Sulik discusses, by technoscience innovations (Sulik, 2011). What I am adding to these discussions is a consideration of how modifications to the integrity of the body also has consequences for identity.

Is it self and a person then?

Contrary to an on-going emphasis on neurological identity that promotes a discourse of the self, located in the brain, there is more to embodiment than an individual as a brain and as an owner of a body. It is undeniable that the self is crucial for experiencing personal reflection. Indeed, it is current in everyday language to be able to 'look inside yourself', 'search for your inner self', 'find yourself' and so on. The practice of mindfulness involves taking time

to gather and pay attention to the thoughts that are experienced as being located in the head. Certainly, the idea of mindfulness has recently gained attention with an emphasis on the practice of awareness and of 'being' in the moment (Williams and Penman, 2014). Mindfulness is a form of meditation on the senses of sight, touch, hearing, smell and taste. It is a way of becoming reconnected and of 'waking up to what's happening inside of you, and in the world, moment by moment' (Williams and Penman, 2014: 39). Most of the discussion in this book draws on authors that include and refer to the idea of self.

I prefer to use words such as identity, person or subjectivity as a way to indicate that I am not focusing on the self, insofar as this is understood as purely cognitively based or perceptually focused in terms of a phenomenological ideology. I wish to avoid using the word self, in favour of using subjectivity or identity as both allude to the more diffuse elements of the personal which is often experientially bodily based and as I then develop can also be relational due to interactions with other people. By identity and subjectivity, I mean the way that an individual experiences herself as embodied. Subjectivity indicates a going beyond the conceptualisation of embodiment as Cartesian Dualism and as a self only having a body. Moreover, identity is different to the phenomenologically based embodiment as perception, because identity focuses on the experience of embodiment (and not embodiment as experience). Additionally, using identity as important in the experience of embodiment recognises that a person's body has an inside as well as its outside body.

Dead or alive? Mine, yours or something else altogether?

Given the emphasis I have placed on considering the experience of embodiment as being ambiguous, and that this experience includes alterations to the inside of the body and its integrity, I turn in Chapter 2 to how body modifications occurring inside the body can alter subjectivity. I hope to do this by answering the question of whether implantation of different materials, whether in kind (animal or human) or type (mechanical), are said or thought to

cause different types of subjectivity alteration My research included four focus groups, followed by a survey questionnaire with young people. I asked people about their hypothetical preferences for different *kinds* of materials originating from different origins (such as from living or deceased human organ donation, non-human animal sources such as xenotransplantation or even from the same body as in 3-D bioprinting) as well as different *types* of materials such as implantable devices.

In the questionnaire, the young people were offered these different kinds and types of materials as options to be ranked in terms of what they would hypothetically most like and what would be the least liked. The results of this research demonstrate that participants in both the focus groups and the questionnaire found xenotransplantation the most unpopular by far. Dislike for xenotransplantation was related to the ethics of treatment and use of non-human animals, physiological, functional and immunological compatibility, as well as implications for the individual as a person, and human beings as a species. When pig's organs are placed inside a human body, it creates a hybrid entity that transgresses the familiar and taken-for-granted boundaries about what is human and what is not, blurring the boundary between species (Chakrabarty, 2003, Alter, 2007, Robert and Baylis, 2003). Although pig's organs are comparable in size to human ones, pigs provoke negative reactions in the focus groups and survey responses, because of the pig's association with dirt. A pig's organ, it was imagined, could make the person more 'pig-like'. Pigs are thought to be unclean, and their usage in transplants challenges known schemata of what it is to be a 'pig' and what it is to be 'human', in a way that organs from another individual or other human beings do not. Xenotransplants are thought to flout the socially constructed natural boundaries between species and provokes a 'yuck' reaction. This can be linked to ideas about pollution, captured by Mary Douglas, as behaviour that 'is the reaction which condemns any object or idea likely to confuse or contradict cherished classifications' as out-of-place (Douglas, 1966: 36). I will also relate pollution behaviour to Kass' (2002) 'wisdom of repugnance'.

This socio-cultural rejection may be as challenging to overcome as the human biological rejection of any foreign organ.

On the other hand, the popularity of 3-D bioprinting as the most preferred option highlights the importance of the similarity of materiality: that is, of having the perceived quality of sameness and compatibility in terms of the human. That is, the origin from a familiar subjectivity (the importance of the person themselves or others close to them), and species compatibility (of other humans). Hence, the next popular choices were a known living human donor, followed by an organ from a deceased stranger. All these human replacements were the most popular, and reflects somewhat the importance of the familiar human and of close personal links or biological ties. Living donors are generally known to the recipient; therefore, it is possible to know the precise origin of the organ. Not just that it is an organ from another human but that it is an organ from a known and familiar human. These findings suggest, therefore, a clear preference for human organ replacements to be sourced from the same person; next, a familiar person; followed by a similar individual (e.g. other human bodies).

In Chapter 2, hypothetical views about implantable devices demonstrate lower popularity than human organ transplantation but are not as unpopular as xenotransplantation. Fears around infection and malfunctioning technology were given as concerns and those who said they least preferred mechanical implants articulated concerns about the repercussions for subjectivity, with ideas of becoming robotic or fears of being more machine-like being given. Those who were in favour of mechanical implants emphasised how the modification would alter their identity, turning them into the cyborgs such as those portrayed in literature and film, for example 'Robocop', and androids portrayed in science-fiction films such as 'Terminator'. The ambiguity of embodiment emerges in various ways and degrees of subjectivity alteration when exploring preferences for different technological and organic materials to be embodied. In sum, I shall argue that although individuals are embodied, they are also embedded, in various social contexts that construct meanings associated with what is human/non-human animal, male/female, or organic/non-organic and although this is obviously projected onto the visible surface of the body the process also occurs in the inside body. Gender appears as a highly porous narrative, as do features thought to characterise non-human animals such as what a pig is. At the end of Chapter 2, I discuss how the concept of *contamination*

or *contagion* as socio-cultural terms can be used to explain why it is that particular social characteristics are attached to the narratives of a human or non-human organ. Contamination is based on the mechanism of transferring characteristics as told by those who have experienced human organ transplantation, and imagined by those who consider how they might experience non-human implantation or transplantation.

Who is afraid of the cyborg? All of us

The data presented in Chapter 2 demonstrate strong preferences about not modifying the integrity of the human body with non-human materials and concerns are articulated about breaching individual subjectivity as well as transgressing the species boundaries. Hypothetical views about implantable devices demonstrate lower popularity than human organ transplantation but are not as unpopular as xenotransplantation. Fears around infection and malfunctioning technology were given as concerns and those who said they least preferred mechanical implants articulated concerns about the repercussions for subjectivity; with ideas of becoming robotic or fears of being more machine-like being given. Those who were in favour of mechanical implants emphasised how the modification would alter their identity turning them into the cyborgs such as those portrayed in literature and film, e.g. 'Robocop' and androids portrayed in science-fiction films such as 'Terminator'. Yet just how relevant are these views to individuals who live with implanted devices?

In Chapter 3, 'Reclaiming the cyborg', I continue to suggest there is a need for an embodied approach to technology as well as a closer analysis of what this intimate techno-organic hybrid body means to subjectivity. That is, given embodiment is ambiguous, what are the consequences for subjectivity when a person's relationship to their body is altered via an active, smart implantable medical device?

From Chapter 3 onwards, the ICD and its role in creating everyday cyborgs is the focus of the rest of the book. Whereas the first half of the book focuses upon human organ transplantation and preferences for other transplantations and implantations, the

second half draws attention to the experiences of living with a device implanted into the body.

However, using the term 'cyborg' as a way to describe people is controversial due in large part to the cyborg's depiction in the genres of science and horror fiction. This is because as Turkle notes: '[W]e approach our technologies through a battery of advertising and media narratives; it is hard to think above the din' (Turkle, 2011). In the public imagination the cyborg is a science-fiction monster born in the image of a technologically enhanced organism as portrayed in a multitude of books and films (Oetler, 1995). Often the distinction between cyborgs, androids and robots is conflated. Robots are fully mechanical artificial sophisticated devices with no organic elements, whereas an android is a robot that bears an external resemblance to a human or non-human living organism. A cyborg is a contraction of the words cybernetic and organism. Placing a cybernetic technology into an organism, as shown in a science-fiction or horror genre, negatively affects the individual's subjectivity. These cyborg monsters are visible techno-organic hybrids typically but not always, shown as being incapable of *feeling* or demonstrating emotions. Somehow the addition of a cybernetic technology creates a less human body and a subjectivity that is inhumane. A feature that was imagined as beneficial by some of the young adult survey respondents.

The 'cybernetic' label I use, however, fits within the original definition of the cyborg, which was used in the 1960s to describe the bodily modifications required to create a homeostatic feedback system for 'men' to survive future space exploration in hostile environments (Clynes and Kline, 1960). In its original use, the cyborg was a means to describe the physiological adaptations that future space travel would need (Clynes and Kline, 1960).

Implanting devices avoids the subjectivity alterations that organic parts may cause the recipient. Mechanical parts have no association with the once living and are not contaminated by them, and cannot in turn, therefore, contaminate the recipient. Whereas organ transplants can cause episodes of rejection, implantable devices are associated with malfunction and infection. In Chapter 3 and Chapter 4, I take a closer look at the issues inserting cybernetics into the body cause their recipients and show how these do not make them inhuman as more commonly associated with science-fiction monsters. On the contrary, it makes them more vulnerable and

more human. The lives of grinders and biohackers, and others who prefer to modify through do-it-yourself implants, are not dependent upon or controlled by their implants and are not made vulnerable by their body modifications (Warwick, 2003, Warwick, 2004). Riding a bike or swallowing a pill does not create a cyborg either. Even though those that originally coined the term ‘cyborg’ might argue that such activities can make you a ‘simple cyborg’ (Clynes and Kline, 1960), it would not fit in the narrow definition offered in this book that takes a much tighter definition of a cyborg. It is narrowly defined through stressing the cybernetic system involved, however it is simultaneously expansive enough to allow other forms of implantable medical technologies. Implanted medical devices are relied upon by medical professionals and patients alike, offering the possibilities of increases in the length and quality of lives. While a broad understanding of the term ‘implantable’ might include those technologies that are consumed (e.g. pharmaceuticals), such products are not intended to be permanently incorporated as an active medical device is which is placed inside the body. I would also exclude other implantable medical technologies such as prosthetics or hip joints that do not, arguably, have the features of a cybernetic device and I use Haraway’s (1991) 3CI – command, control and communication-intelligence. For example, an active medical device is an instrument, which, with its software, can be used for diagnostic and therapeutic purposes, relying on a power source other than that generated by the body.

Other versions of cybernetic

Colleagues and I have suggested that implantable medical technologies can have different levels or forms of current ‘smart’ or ‘cybernetic’ technologies (Haddow, Harmon and Gilman, 2016). In our previous research, we suggested that ‘smart’ technologies can carry a ‘sting’, or rather multiple stings relating to, on the one hand, being complex, autonomous and responsive, and on the other side, igniting concerns about lack of control and vulnerability (Haddow, Harmon and Gilman, 2016; Harmon, Haddow and Gilman, 2015). The ICD in particular has the potential to alter the recipient’s subjectivity and identity through creating a hybrid techno-organic

body that is being controlled by a cybernetic system. Cybernetic technology does not cause a chronic case of dehumanisation as envisioned in popular culture and literature despite modifications to the human body, making it less human in organic terms.

On the contrary, a *cyborgisation is about the reconfiguration of humanisation caused by the vulnerability*. However, the term ‘cyborg’ has cultural and literary infamy that does not allow space for its use to describe individuals. This fallacy of ‘dehumanisation’ through cyborgisation is inherited from the creation of the cyborg as a male science-fiction monster. Creating and existing as an everyday cyborg cannot be any more different from the portrayal of celluloid on the emotionless and inhumane cyborg monster. Instead, the everyday cyborg becomes more vulnerable, despite becoming less human in a new techno-organic hybrid form.

Since Haraway published her ‘Cyborg Manifesto’, the use of medical technologies that augment and replace human organs and limbs has increased exponentially, and improved dramatically, resulting in increasing numbers of people becoming, to all and intents and purposes, cybernetic organisms. For Haraway, the cyborg is a ‘cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction’ (1991: 119). Haraway’s cyborg has an ability to liberate individuals from classification. The cyborg is a challenge to us to break away and accept that we have responsibility for the cages we have constructed of who and what we are. Haraway argues this is not about focusing purely on the technology per se, but upon the socially structured relations amongst people that have been historically constituted (1991: 165). As Haraway suggests although ‘we may be all cyborgs’, I suggest that it is time to draw attention to who exactly the ‘we’ are.

Few studies examine how the ‘cyborg’ condition is created as an empirical entity, and as such, this book offers unique insights into life with a heart device. Scholars have suggested terms such as ‘ICD cyborg’ (Oudshoorn, 2015, Oudshoorn, 2016) or the ‘mundane cyborg’ (Mentor, 2011), and this body of research is making significant contributions to the emerging field of cyborgisation. For instance, in Chapter 3, I expand Oudshoorn’s term the ‘ICD cyborg’ as she uses it to refer to the participants in her research. For reasons that I detail further in Chapter 3, I introduce the term

‘everyday’ to highlight cybernetic technologies such as ICDs, which as technoscientific innovations are increasingly relied upon daily by clinicians and health professionals to save lives. The ‘everyday’ encompasses the increase in medically created cyborgs while highlighting the day-to-day activity of routine. And is also about the extraordinary experiences of living as a cyborg when life itself cannot be taken for granted (Das, 2010).

As I will argue in more detail in Chapter 3, the inclusion of the prefix ‘everyday’ is essential as it offers analytical purchase in studying variation in those who experience differing cyborgisation processes. The usefulness of the ‘everyday cyborg’ would consider the conditions the cybernetic system was inserted in, where and what for, the permanence of the device and the possibility of removal, as well as the complexity of its functionality and ultimately who benefits. The term ‘everyday cyborg’ is made vulnerable from cyborgisation, and the term ‘everyday’ answers the plea to examine less attractive technoscience options made by Timmermans and Berg that: ‘in the seemingly “technical” matters that deeply relevant, social issues are “hidden” – such as inclusion/exclusions of certain groups or voices, of the subtle restructuring of patients’ or professionals’ identities’ (2003: 108). By reclaiming the cyborg for the daily routine, social issues that are previously ‘hidden’ can be made visible.⁴

So, one of the ‘hidden’ aspects is the way current surgical practices reflect technological developments that do not challenge existing inequalities in cyborg society but reify and amplify them. Hence, the value of the term the ‘everyday cyborg’ encompasses the process of social stratification in cyborgisation that benefits one sub-section of the population over another. That is, as I shall show later in the book, the everyday cyborg that is created through the insertion of a cybernetic technology such as ICDs are generally male. The term ‘everyday cyborg’ is needed therefore to highlight how the practice of cyborgisation in hospital operating theatres are creating fewer female everyday cyborgs than males, reflecting male cyborg dominance in literature and culture, as well as in day-to-day life. The everyday cyborgs are created within social structures that reflect developments and practices and are therefore reifying but not (yet) challenging, existing inequalities in a cyborg society.

Cyborg vulnerability

In a future in which (some) individuals may become cyborg, more attention needs to be paid to the lived experience of living with technology that has increasing autonomy over and in our bodies. Reclaiming the ‘cyborg’ term allows a more thoroughgoing and wide-ranging discussion about the vulnerabilities created by implanting cybernetic devices into human bodies (Oudshoorn, 2016). ICDs can cause their (albeit male) cyborgs and their significant others emotional, physiological, psychological and social challenges that are rarely made visible. A cyborg identification thus reawakens interest in a techno-organic hybrid condition, leading to understandings about the new obstacles and vulnerabilities that are created. And as Oudshoorn argues, these new forms of vulnerabilities emanate from within the human body (Oudshoorn, 2016).

Using the voices of the everyday cyborgs in Chapter 4, ‘Everyday cyborgs and the love-hate cybernetic relationship’, I describe the day-to-day experiences that living as a cyborg involves and what this reconfiguration of vulnerable humanisation entails. Everyday cyborgs and their significant others have important stories to share about the varying initial reactions, and subsequent acclimatisation to, living with ICDs. In 2014, throughout a two-year period, I conducted 21 face-to-face interviews with everyday ICD cyborgs in Scotland, UK.⁵ With National Health Service (NHS) ethical approvals, participants were recruited using NHS gatekeepers and a consent-to-consent approach. Using interview data from 21 everyday cyborgs and 13 of their significant others, I argue that everyday cyborgs face unique challenges that separate them from other cardiac patients. Despite the vast amount of research reported on enhanced life function and improved quality of life, some research suggests ‘living the hybrid life’ via cardiac devices has detrimental effects on some recipients (Green and Moss, 1969, Tchou et al., 1989, Luderitz, et al., 1994, Sakensa, 1994, Duru et al., 2001, Burns et al., 2005, Kuhl et al., 2006, Birnie et al., 2007, Pedersen et al., 2008, Magyar-Russell et al., 2011, Marshall, Ketchell and Maclean, 2011, Yuhas et al., 2012, Vriesendorp et al., 2013). In all cases, this is an existence whereby the everyday cyborgs and their families need support through the adaptations required for the cybernetic changes in embodiment and social life.

I go into detail about the love/hate relationship the everyday cyborgs told me that they have for their ICD. These challenges to living a techno-organic hybrid life can be summarised as: 1) acclimatising to an alien(ating) device that involves it becoming a 'part of the body' and 2) reconciling to being under the control of the ICD.

On becoming a cyborg: living the techno-organic hybrid life

For the everyday cyborgs, it is the paradox of intimacy that is created as the cybernetic device within the body also creates distance (as they cannot reach it) and a lack of control (as its functioning cannot be altered by the everyday cyborg either). In creating the techno-organic hybrid form of a cyborg, the body modification involved is a technological addition. The narratives about technological devices do not evoke the porosity or contamination as those about organic materials. The stories focus more on how the everyday cyborg 'humanises' or makes the ICD a 'part of them'. As stories from the everyday cyborgs (outlined in Chapter 4) show, the ICD's alien presence is caused by breaching the integrity of the body during its implantation. From then, the ICD continues to be present on both the inside (it is inside-out) and outside (from the outside-in). The sensation of the ICD being on the inside, as well as a skin silhouette on the outside, reminds the everyday cyborg an 'alien' has breached the integrity and image of their body existing inside their bodies. Cyborgisation therefore makes the body's absence that is a feature of everyday living become absent or in Leder's terms a 'dys-appearance' (1990). An acclimatisation to the cyborgisation process is to a new techno-organic hybrid identity, and strategies are required to overcome vulnerability to cybernetic technology. The area of the chest where the ICD exists becomes a focal point for the everyday cyborg. For the everyday cyborg, the absent absences of the body and organs are not static states but variable, e.g. when the body heals the ICD becomes slowly enmeshed into the body creating a more comfortable form of techno-organic hybridity. Everyday cyborgs live with a machine inside their bodies that they can feel from the inside out; there was a strong sensation of

the ICD being inside the body. For most, most of the time, the sensation was not dwelt upon and the body is, as Leder (1990) would suggest, an absence in the same way as the rest of the viscera are. Acclimatisation to hybridity occurs when the ICD's body presence becomes an absent absence, and the body returns to an absent state. This involves the cybernetic device becoming made into a 'part of the person' – a body addition that becomes part of their identity, integrity and image. Ironically, despite the everyday cyborgs' inability to reach their device, the communication feature of the ICD might leave the everyday cyborg vulnerable to hacking into the device. In other words, cyborgisation can make the body vulnerable and is a vulnerability emitting from both the inside-out and the outside-in. This ability to interfere with the device's ability to function or in accessing the data is currently dwelt upon by regulatory organisations and policymakers. Little is known about how individuals who are implanted with such features perceive such threats (Haddow, Harmon and Gilman, 2015). I outline the everyday cyborgs' views on the possibility of hacking and show these concerns were reported as not relevant to them.

Vulnerability from the cybernetic device within

As per the issue of unauthorised access and adjusting to a new techno-organic hybridity, the second way a new vulnerability results from cyborgisation is rooted in the specific capacity of the ICD to deliver a powerful electric shock, physically compromising the everyday cyborg. This is a shock in both meanings of the word 'shock', referring to its suddenness and that it comes from an electrical source. Indeed, studies have repeatedly shown that anxiety is heightened in patients whose ICDs have fired compared to those who have not experienced shocks (Hegel et al., 1997, Dougherty, 1995). The electric shock treatment that the ICD emits is noted to be the most distressing aspect of treatment for many. The shock that the ICD emits is shocking both in terms of the pain that it causes as well as the unexpectedness of its occurrence. Oudshoorn suggests that '[H]aving a machine inside your body without knowing when or where it may jolt you induces feelings of disbelief and anxiety', leading her to discuss the new vulnerabilities that ICDs cause

(2016: 8). In her analysis of ICD patient internet support pages, Oudshoorn (2015) notes the ICD is a device that acts outwith the control of the patient, and is an implantation that is rarely reversed. Oudshoorn also interviewed 14 individuals with ICDs (as well as conducting observations at the clinics during check-ups), suggesting that cyborgisation leads to new types of vulnerability ‘as an internal rather than an external threat and as harm you may try to anticipate but can never escape’ (Oudshoorn, 2016: 267). The findings from my research complement this body of work and suggest that there are strategies to overcome the vulnerability created by a new techno-organic hybrid identity which the everyday cyborg uses to allow acclimatisation:

- 1 How the techno-organic hybrid embodiment is acclimatised to depends on whether the ICD is perceived to be a supportive aid. This reconciliation needs a change from seeing the ICD as doing harm to the everyday cyborg, to switching to experiencing it as doing something for them. In a similar way that the ICD become part of their body, the ICD is a benefit in their lives.
- 2 Most of the everyday cyborgs who were shocked explained how it was *their* actions causing the ICD to fire (whether it was by excess exercise, consumption or concern) thus re-inserting their control over the ICD firing.

Eventually, and for some periods, the ICD is no longer a source of alienation, and it becomes accepted as a part of the everyday cyborg’s body image and integrity, of their identity and of their lives (that includes others around them).⁶ Being an everyday cyborg, then, is a fluid experience of ‘dys-appearance’ – of being aware and focused on embodiment as a techno-organic hybrid after implantation and post-activation, and then of this status becoming an absence – as the everyday cyborg acclimatises and the ambiguity of embodiment is no longer relevant. The issues around the body disappear to be replaced with normal living (Sobchack, 2010, Leder, 1990).

The biomedical nemesis

The intimacy between technology and organism has a particular rehumanising effect from living the techno-organic hybrid life and

seeking control over a cybernetic technology that can be seen and felt but cannot be reached or removed. Concluding in Chapter 5, I refocus on the accounts of altered subjectivity and compare the materials from non-human animal, mechanical and human. That is, how respondents expect to take on characteristics of their human or non-human animal donor; and then how recipients relate their experiences of cybernetic technologies that require strategies of acclimatisation (overcoming body hybridity and vulnerability caused by the device). For example, the ICD is an alien effect and a body modification that changes the body and alters subjectivity in a less porous way than a human organ transplant does, or a xeno-transplant is predicted to do. With technological additions such as the ICD, the risk to subjectivity is not that of becoming more like the donor (e.g. human or non-human animal). Quite obviously, there is no donor to become like. It is not the case that because of the technological artefact and a creation of techno-organic hybrid body, making the individual's body less human, that this causes an alteration in subjectivity to one that makes them less emotional, caring and humane, as is depicted in the process of cyborgisation in literary or cultural narratives. In contrast to the popular depiction of cyborgisation as being dehumanising, the everyday experience of cyborgisation is of vulnerability and rehumanisation.

The increasing reliance on technoscientific processes may be a case of a much wider process of 'biomedicalisation'; a state that is different to, but is sprung from medicalisation for the modern age. Biomedicalisation refers to 'the increasingly complex, multisited, multidirectional processes of medicalization that today are being reconstituted through the emergent social forms and practices of a highly and increasingly technoscientific biomedicine' (Clarke et al., 2010: 162). I argue that due to a reliance on the technoscientific 'fix' (in terms of addiction and solution), it is creating an identity crisis that is part of living in an increasing 'hypercapitalist, technomanic' society (Valente, 2011). Inspired by Illich's (Illich, 2003) medical nemesis, whereby medicalisation is the treatment for the diseases that medicalisation itself creates, so it is with technological and cybernetic fixes creating a biomedical nemesis. In as much as there was never any actual choice to be made between animal, mechanical and human, for some, there was never an element of choice in becoming a cyborg.

Notes

- 1 From 2013–18, I conducted a sociological study in the UK, funded by the Wellcome Trust, called ‘Animal, Mechanical and Me: The Search for Replaceable Hearts’ of which I say more later.
- 2 It is interesting to note that the term visceral can mean having deep feelings about something that is not necessarily based on reason (as well as pertaining to the fleshy insides of the human body).
- 3 Shildrick argues that a phenomenological approach to organ transplantation introduces a harm being done both to the unity and identity of individuals:

Once a phenomenological approach to any organ donation – Western or non-Western alike – is undertaken, then all sorts of difficult questions begin to emerge that should at least make us reconsider the assumed benefit of transplantation procedures. The problematic of the assault on a body’s putative unity and self-identity – whatever form that takes in the social imaginary – cannot be set aside in favour of positivistic representations of biomedical advance.

(Shildrick, M. 2010. Some Reflections on the Socio-cultural and the Bioscientific Limits of Bodily Integrity. *Body & Society*, 16, 11–22)

- 4 Others who have adopted the term ‘everyday cyborg’ use it more broadly, but as equally important so to interrogate legal issues such as ownership and risk (Quigley and Ayihongbe, 2018).
- 5 One participant preferred to share his experiences through e-mail and this information is not reported.
- 6 Indeed, I discuss Dalibert’s research findings, which suggest there is an acclimatisation or incorporation process necessary to adjust to a deep brain stimulator. This is based on the individual’s acceptance of the technology as being ‘part of them’, but can also be affected by intercorporeal relationships with others (Dalibert, 2016).