Self-Identity and the Evaluation of Medical Technology

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This is a pre-print of the following book chapter:
Brey, P. A. E. (2016). Self-identity and the evaluation of medical technology. In M. Bottis, & F. Panagopoulou-Koutnatzi (Eds.), *Bioethical concerns: the human face* (pp. 53-66). Athens: Papazissi Publications.

1. Introduction

In this essay, I will show how different types of medical technologies can be understood, through technological extension theory (Brey, 2000), as extensions of the human body and mind that enhance its functioning. This understanding of medical technologies as bodily extensions will be used to analyze how medical technologies can transform our identity as persons. To be precise, it will be analyzed how they transform agentive, bodily and social self-identity. These impacts on identity will be used to develop ten criteria for the assessment of the quality of medical technologies in relation to their impact on self-identity.

The structure of the essay is as follows. First, I will introduce the central concept of self-identity, along with three varieties of it: agentive, bodily and social self-identity. It will be argued that agentive self-identity is the most important for the three in analyzing medical technology. In the subsequent section, the focus is on agentive (self-) identity, and this notion will be related to technology, and in particular to technological extension theory, according to which technologies extend or improve human abilities present in the unaided body. It will be analyzed how technology can extend the body in different ways.

This general analysis of agentive identity and technology will then provide the framework for an analysis of medical technology from the standpoint of technological extension theory, and its implications for agentive identity. Four fundamental types of medical technology will be distinguished that each have different impacts on agentive identity. In a final section, it will be argued that good medical technologies should have a positive impact on self-identity, and it will be considered what criteria they must satisfy to have a positive impact on the three types of identity that were discussed: agentive, bodily and social identity.

2. Self-Identity: Agentive, Bodily and Social

The notion of identity, when applied to persons, is customarily used to designate those qualities that jointly define a person as a unique individual, distinct from others. A fundamental distinction must be drawn between two types of identity. The first of these is the identity attributed by a person to him- or herself, which is sometimes called *self-identity*. Self-identity, then, is the way in which a person or *self* reflexively understands him- or herself. A second type of subjective identity is the identity attributed to a self by others. I shall call such identities *third-person identities*, because they are constructions that are based on a third-person perspective rather than on the first-person perspective on which self-identities are (partially) based.

The focus in this essay will be on self-identity, or the kind of person that we understand ourselves to be. Our *self-concept*, by which we place ourselves into different categories, is central to our self-identity. Studies of different dimensions of self-identity suggest, however, that the self-concept involves self-attributions that relate to at least the following five domains: (i) *the body* (e.g., Cash & Pruzinsky, 1990); (ii) *character traits* (e.g., Feldman, 1990); (iii) *fundamental values and beliefs* (e.g., Taylor, 1989); (iv) *abilities* (e.g., Bandura, 1977); (v) *social identity* (e.g., Tajfel, 1982); and (vi) *personal history* (e.g., Giddens, 1991). This essay will concentrate on three of these five, which are most relevant to an understanding of medical technology: self-attributions relating to the body, abilities, and social identity.

First of all, the domain of the body relates to *bodily identity*, which has two separate dimensions, which may be termed *bodily appearance* and *bodily sense*. Bodily appearance, as an object of self-identity construction, relates to the way in which one represents the outer appearance and visual shape of one's own body. The resulting self-representation is encoded in a set of *body images* (Cash & Pruzinsky, 1990) which are self-schemas that encode images, beliefs and attitudes about the appearance of one's body. These may include perceptions of one's overall body shape, perceptions of one's nose as crooked, one's face as pretty, one's body as obese, one's skin as dry, one's voice as soft, etc.

Bodily sense is the experience of the body through proprioception (the perception of aspects of one's body through sensory receptors within the body, that indicate the relative position of the joints, the ways one's muscles feel, etc.). Bodily sense is represented in what is sometimes called a *body schema* (e.g., Tiemersma, 1989; Merleau-Ponty, 1962). The body schema is an organizing structure that presents one with a unified understanding of one's body, which is experienced as a unified whole or 'Gestalt'. The body schema moreover provides one with a pre-reflective, immediate knowledge of the position of one's body parts. Put together, body schema and body images help individuals maintain a physical, spatial distinction between self and environment.

Social identity is normally defined as the way in which one defines oneself as belonging to particular social groups (Markus & Wurf, 1987; Tajfel, 1982). A social group is a collection of individuals that are perceived by themselves and others to share one or more attributes that are assigned a broader social, cultural, or economic significance. Social groups, by this definition, include collections of individuals identifiable by religion, nationality, political affiliation, occupation, age, sex, race, physical ability, family ties, identification with a subculture, etc. Physical and psychological attributes like being tall, being melancholy, or being forgetful are not, by this definition, part of one's social identity, as individuals with these traits are not, or hardly, distinguishable as separate social groups with their own historically formed identity. The notion of social identity is sometimes contrasted with that of *personal identity*, which is based on self-categorizations that include idiosyncratic attributes of individuals that includes ones having to do with their physique and psychological traits.

Ability constitutes the third domain for self-identity formation that will here be called *agentive identity*. Abilities are properties of individuals that define what they are capable of doing and enduring. People tend to identify their self-perceived (in)abilities, as psychological, physical, or social (Shavelson & Bolus, 1982). Psychological, or mental, (in)abilities are abilities in the realm of perception, thought, and memory (e.g., the ability

to calculate square roots). Physical (in)abilities and dispositions relate to the health and functioning of one's own body, as well as to physical skills (e.g., the ability to survive illnesses, or to play the piano). Social (in)abilities relate to one's perceived abilities to interact socially and to attain desired social responses (e.g., the ability to charm an audience). In the next section, it will be considered how one's self-perceived abilities help constitute one's self-identity as an *agent*: an individual capable of perceiving, reflecting on, and acting on his external environment, and how agentive identity relates to technology.

3. Agentive Identity and Technology

One's agentive self-identity is primarily defined through one's self-perceived abilities. Yet, agentive self-identity is more than the mere product of a self-perceived set of abilities. It is also shaped by deep metaphysical beliefs about causation, free will, and individual autonomy. These beliefs determine one's general concept of agency, which in turn shapes the way in which one defines and evaluates the abilities and actions of oneself and others. If someone holds that all significant events in life are predetermined, for example, she will not attribute capacities to herself by which she can significantly alter her personal circumstances. If, instead, a person believes in the image of the autonomous, self-determining agent, then she will attribute capacities to herself by which the future seems to be much more under her control. These metaphysical beliefs are in turn shaped by one's social and cultural environment, but also by the idiosyncratic experiences of the actions and abilities of oneself and others.

Let us now focus on the question of how technology transforms agentive self-identity, which we need to understand in order to be able to analyze how medical technology affects agentive self-identity. Technology, it has often been pointed out, changes both the nature and the scope of human action. It endows individuals with new abilities, by which are able to perform novel actions, and extends the scope of their actions (e.g., Jonas, 1984). It is only to be expected that these changes in the nature and scope of human action are also reflected in a changed conception of human agency, and a corresponding change in agentive self-identities. What is necessary, however, is a detailed analysis of these changes.

The guiding assumption in performing this analysis will be that technology extends human abilities by building on, enhancing, or replacing already existing abilities of the unaided body and mind. The resulting extensions of their own natural abilities, as perceived by individuals, redefine the self-perceived abilities of individuals and transform their agentive self-identity. The idea that technology is an extension of the human organism is encountered regularly in the history of thought about technology. Roughly, this idea implies that technical artifacts serve to amplify the human abilities, exhibited by their bodily and mental faculties, by continuing these abilities beyond the body. This anthropological view of can, in different versions, be found throughout history, but only received its first extended statement in a 19th century treatise by German philosopher Ernst Kapp (1877). Scholars who have propagated this view since then have included Henry Bergson (1911), and Arnold Gehlen (1980/1957). Perhaps the most famous text, however, in which this view is extensively employed, is Marshall McLuhan's *Understanding Media*, subtitled *The Extensions of Man* (McLuhan, 1966).

Artifacts extend the abilities of the unaided body and mind in different ways. First of all, a distinction can be made between technological extensions of perceptual, motor, regulatory, and cognitive functions. Artifacts like glasses, telescopes, hearing aids, and televisions extend perceptual functions. Motor functions are extended by tools like hammers, drills, and hoisting cranes, and vehicles like bicycles and cars. Regulatory functions of the body are extended by clothing, central heating, and dialysis machines. Cognitive functions are extended by information technologies.

Another distinction is that between technological artifacts that are *embodied* and that remain *disembodied*, resulting in a distinction between embodied and disembodied extensions. When using an artifact, individuals sometimes establish a relation with it in which it is no longer experienced as separate to themselves, but is experienced as having 'withdrawn' into their body. It has then moved from being objects of perception and action in their environment to means through which the environment is experienced and acted on. This type of relation between an artifact and a person is known as an *embodiment relation*. It was first pointed out by Heidegger (1962/1927) and later by Merleau-Ponty (1962/1945), but has been studied most extensively by Don Ihde (1979, 1990).

Two everyday examples of embodiment relations are the use of glasses and the use of tools. The use of glasses typically involves an embodiment relation. When using glasses, the individual does not experience them as an object that can be perceived and manipulated. Instead, they are experienced as a transparent means that, just as one's eye lenses, are used to engage the world with. Similarly, when using a hammer, the hammer is no longer experienced as the object of action or perception, but as a means, much like one's hands, by which the world is engaged. Merleau-Ponty (1962) claimed that such artifacts, when used, become part of one's body schema. The body schema, as defined earlier, presents one with an understanding of one's body, which is experienced as a unified whole or 'Gestalt'. It is apparently possible to 'absorb' artifacts into one's body schema and experience them as direct extensions of the unaided body, through which perceptual and motor skills can be expressed directly and effortlessly.

To say that an artifact is embodied is not to say that it literally becomes part of the body. Some medical technologies, like prostheses, literally become part of our bodies. Such technological artifacts I will call *internal extensions*. Artifacts that do not become a permanent part of our bodies I will call *external extensions*.

It can be concluded that agentive self-identity is transformed in different ways by technological artifacts, depending on what kind of human abilities are extended, whether or not the technology becomes part of the body schema in an embodiment relation, and whether or not it literally becomes part of the body.

4. Agentive Identity and Medical Technology

I will now turn to the implications of medical technology for agentive identity. My focus will be on medical technologies that permanently or temporarily transform the abilities of patients, and not any other medical technologies that may be used by doctors or patients but that do not directly affect patient abilities.

I will argue that from the point of view of extension theory, four classes of medical technologies can be distinguished that extend the abilities of humans in different

ways. First, *therapeutic medical technologies,* including medical devices and pharmaceuticals, extend agency by restoring bodily or mental ability and health. They can be internal or external, and temporary, periodical or permanent. Pacemakers and deep brain implants, for example, are internal, and permanent or periodical. Portable infusion pumps and nonportable hemodyalisers are external and permanent or periodical. An antibiotic treatment is temporary and internal, and an orthotic device is temporary and (usually) external. The operation of therapeutic technologies is supportive to normal agency in the sense that they do not add new technological abilities to the body, but rather restore organic abilities of the body that were impaired. The extent to which they restore "normal" agency and hence agentive self-identity depends on the extent to which the technology is temporary, internal and/or nonintrusive.

Second, *prosthetic technologies* are technological replacements of body parts which (partially or completely) restore function. They become part of the body schema, and can be internal or externally attached to the body. Examples are artificial hearts, artificial limbs, skin grafts, artificial pancreases, and cochlear implants. Consequences of prostheses for agentive self-identity are that they partially (or sometimes fully) restore "normal" agentive self-identity may. The extent to which they do depends on the extent that the prosthesis is internal, embodied, non-intrusive, and yields similar functionality.

Third, *assistive technologies* are external, non-invasive technologies that assist people with disabilities by replacing biological function or aiding impaired biological function. Examples are wheelchairs, glasses, accessible computing, speech generators, drinking aids, and cognitive orthotics. Assistive technologies partially or sometimes completely restore "normal" abilities. However, they do not fully restore normal agentive self-identity, because they are external to the body and may not always become fully incorporated into the body schema. In addition, they often only aid with specific tasks, and usually do not restore the general functionality of impaired organs.

Fourth and finally, *enhancement technologies* are technologies that augment normal abilities or introduce qualitatively new ones through prosthetic, pharmaceutical or genetic means. Some of these technologies currently exist, but many are only projected to exist in the future. Examples are superhuman bionic limbs, eyes or ears, nootropic drugs, designer babies with superhuman abilities, and implanted artificial memory with superior abilities. Enhancement technologies "enhance" agentive identities. Because the abilities of the "unaided" self are enhanced, people develop a self-concept of superior agency. This self-concept may however be impaired if enhancements are partially external or are not properly embodied. People will then see themselves as having superior agency, but will also experience their agency as not fully resulting from their own bodies.

5. Self-Identity and the Quality of Medical Technology

What is good medical technology that restores or aids human function? No attempt will be made to develop a full-blown account of quality criteria for such medical technologies. What I will do is propose criteria for evaluating medical technology in relation to its effects on self-identity, especially agentive, bodily and social identity. If we want medical technologies to contribute to the well-being of patients, a very important part of that is that they are experienced by patients to have a positive impact on their self-identity. By

enhancing self-identity, they will enhance self-esteem, and ultimately well-being. In what follows, the main quality criteria for positive impacts by medical technologies on agentive identity, bodily identity and social identity will therefore be discussed.

As a first step, we will consider criteria for positive impacts on agentive identity. This type of identity was analyzed extensively in the previous sections. There appear to be four main criteria that are relevant for positive consequences for agentive identity:

(1) *Ability.* Most importantly, medical technologies have positive consequences for agentive self-identity if they give people the ability to perform actions that they want to be able to perform.

(2) *Reliability.* People should not just be able to perform certain actions, they should also consistently and reliably be able to perform them.

(3) *Convenience.* In addition, people should be able to perform these actions without extraordinary effort, time, risk, or inconvenience to oneself and one's surroundings.

(4) *Autonomy.* Finally, people should be able to perform these actions without further assistance from external aides (drugs, devices), help from others, or the presence of assistive features in the environment (e.g., wheelchair ramps).

Next, we will consider criteria for positive impacts on bodily identity. Remember that bodily identity is dependent on bodily appearance and bodily sense, which represented by a body schema. Therefore, two criteria relate to impacts on bodily appearance and bodily sense. A third criterion relates to one's self-understanding of the extent to which one's body (as represented in body images and the body schema) is still fully human.

(1) *Appearance*. People generally strive to retain normal bodily appearance when they use restorative or enhancing technology. So one criterion is whether such appearance is maintained. If not, how nonintrusive and unaesthetic is the technology?

(2) *Body Schema.* People generally prefer technology that they regularly use to be incorporated into the body schema. So technology positively affects bodily identity to the extent that it can be embodied in this way.

(3) *Humanness*. People generally prefer their bodies to be organic and "human". If nonhuman, artificial materials and machine parts are used, people may question whether they are still fully human, and may feel that they have become part machine.

Finally, let us consider criteria for positive impacts on social identity. Positive effects on social identity are those by which people see themselves as belonging to social categories that they evaluate positively, or that they believe are evaluated positively by others. Two criteria are most relevant:

(1) *Normalcy.* People want to be considered normal, not abnormal. They particularly do not want to deviate from the norm by being considered considered inferior or undesirable in any way. Hence, medical technologies

should avoid introducing abnormalities in people, regarding ability, appearance, behavior, or otherwise.

(2) *Dependency:* People generally do not want to be socially dependent on others for functioning in society. If a technology makes one socially dependent on others, this will tend to negative affect people's social identity.

In conclusion, this paper has explored the relation between medical technology and self-identity, specifically agentive, bodily and social identity. It was argued that in developing and selecting medical technologies to restore or enhance human ability, their effects on these three types of identity should be considered. Nine criteria were discussed for evaluating medical technologies for their consequences for these varieties of self-identity. It is recommended that quality assessment of medical technologies take these criteria into account.

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