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Mindful Mending: The Repair of Thought and Action Amidst Technologies

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MINDFUL MENDING:

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> Acknowledgments and citations are a matter of distributive justice, the currency in which we pay our intellectual debts. The payment is important; indeed, there is a saying in the Talmud that when a scholar acknowledges *all* his sources, he brings the day of redemption a little closer. But it isn't easy to make that full acknowledgment; we are probably unaware of, or unable to recognize, many of our deepest debts—and so the great day is still far off. Even here, justice is unfinished and imperfect.
>
> -Michael Walzer (1983, xvii)

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For Janelle

Then they will rebuild the ancient ruins,
They will raise up the former devastations;
And they will repair the ruined cities,
The desolations of many generations.

—Isaiah 61:4 (NASB)

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INTRODUCTION

Motivating this project are experiences such as my great aunt's. My great aunt lives in Port Monmouth, New Jersey—an area that was badly damaged by Hurricane Sandy in 2012. When Hurricane Sandy occurred, she was 89 years old and had lived in the same apartment in Port Monmouth for thirty years; 17 of those years were with her late husband. When calls began to go out during the hurricane that residents of the neighborhood should evacuate, she resisted leaving. The apartment was filled with memory-laden objects, such as a hi-fi record player that her husband gave her when they got married, and it was difficult to leave behind all of the familiar implements of her life. It was not until floodwaters had entered her apartment and were up to her knees that she agreed to leave with a rescue worker. When she returned the next day with a family member, she discovered that everything in her apartment had been badly damaged by the storm surge waters.

Whether it is an elderly person's refusal to leave during a storm, or, in other circumstances, to leave behind a home and move into an assisted living facility, it is tempting to simply write these situations off as instances of irrational stubbornness. But, as with most things in life, there is more at issue if we look a little deeper. Besides the important ways in which we vest aspects of our identity in our possessions and lived spaces, the physical arrangement and use of various technologies inside practiced places can also assist in the crucial moral and political capability of personal autonomy—the ability to make free and authentic, intentional plans and decisions for oneself. Imagine an individual whose biological memory is failing and uses written instructions and reminders placed in key locations throughout his home so as to enact memory processes that are vital to carrying out important actions. Or consider another person who uses various objects in her home, not simply to cue the telling of a story, but to actually shape the contours of the story by informing the ways that persons and events are remembered. To ask people to leave the practiced place of their home is more than simply asking them to leave behind material possessions that act as signs and expressions of an already formed identity; it is asking them to sometimes leave behind those external, physical elements that are integral to realizing robust thought and decision making processes that allow them to even form and maintain a practical identity.

Since the 1990's (and earlier when including work by Merleau-Ponty [|1945| 2012] and others), there has been a growing amount of research into the ways in which cognitive processes (e.g. remembering, reasoning, perception, etc.), instead of being strictly limited to brain activity, are better understood as involving the entire body and/or the body as it engages with artifacts in the extraorganismic environment (see Rowlands 2010; Clark and Chalmers 1998; Clark 1998, 2004, 2008a; Wheeler 2005; Menary 2010; Robbins and Aydede 2008; Sterelny 2010; Noe 2009). In this manner, cognitive processes then are not to be constantly inferred on the basis of bodily behaviors that act as signs referring to entirely interior thoughts. Instead, cognitive processes are sometimes on vivid and direct display in the world. This gives new significance to the role of things and the built environments in our lives. Our built environments and the technologies therein are no longer knit together by strictly practical intentions (safety, work, play, comfort), but are also alive with cognitive/epistemic significance as they are integral parts of our thinking, among other things, about who we have been, who we want to be, what we value, and what we want to accomplish. Accordingly, technologies such as computers, notebooks, and iPhones not only serve as pragmatic tools, but can also be utilized as valuable means of scaffolding portions of thought processes such that they are realized by precise configurations of brain, body, and artifacts in the world.

Nonetheless, floodwaters will rise, fires will ravage, thieves will steal and vandalize, and friends, family, and strangers will bump into, tear apart, overturn, throw away, and misplace things. Our technologies and environments are damaged in a thousand dramatic and mundane ways, whether by catastrophic natural events such as a hurricane or our own everyday tendencies to drop and misplace our own and other's possessions. This project begins with the experiences of broken things that are utilized as integral elements of cognitive processing and considers how we should morally respond.

For those in positions to help (government agencies, neighbors, community groups, emergency workers, friends, family members, and well-placed strangers), what is the appropriate ethical response to people who are cognitively situated in the built environment and amidst technologies, and therefore sometimes profoundly harmed by a range of situations in which damage is done either to the physical places they inhabit or the technologies they use for cognitive processing? While replacement of the broken object or structure might be our initial intuitive response, *merely* replacing an object seems to fall short in important respects when what is broken was not just any object but an object that was utilized by a person to think, and especially, to think about who she is (her history, values, convictions, hopes, dreams) and what she really wants to accomplish now and in the future. Mere replacement may solve the problem of a broken object, but it does not attend to the object as it is used relative to an individual (for example as part of a cognitive processing task). Merely replacing an object(s) also overlooks the damaged relationship of trust/reliance between an individual and an object when the object fails to function as needed. In short, mere replacement misses the lived milieu that an object exists within. But, if not mere replacement, then what is the fitting ethical response?

My claim is that the more attentive analysis and sustained process of repair, whereby efforts are taken to understand what remains of a damaged object, what caused the damage, and how it could be set in order again and fitted into a reliable, lived relationship with an individual is the more comprehensive and appropriate ethical response. I argue that repair (in contrast to mere replacement) ought to specify our responsibility to care for individuals who are cognitively dependent on particular configurations of technologies and suffer cognitively significant harms following damage to those technologies.

As Elizabeth Spelman (2002, 135) observes in her book on the concept and practice of repair, although repair is referred to in a wide variety of settings in daily life (automotive, genetic, manuscript, art, clothing, relational), there is little theoretical explanation of what repair is and how we recognize a successful repair or a failed repair.[1]

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[1] In philosophy proper, Margaret Urban Walker and Hilde Lindemann Nelson offer especially prominent applications of repair in an ethical setting. Walker (2006) has set forth an account of the "moral repair" of relationships between moral agents and communities (which is closely allied with the concepts of

Footnote continues on the next page

Eric Higgs (2003, 93-96) testifies to a similar lack of consensus and rigor in defining the related concept of restoration in the context of ecology. To fill in these gaps, Chapters 1 and 2 provide clarification and development of the concept of repair in preparation for making the fullest use of repair as an ethical concept and in order to avoid ambiguous meanings resulting from associating repair with simply "fixing."

Given the plural senses of repair and the wide array of settings in which the concept is applied, my goal in Chapter 1 is to explicate and highlight central and distinctive features of repair by considering understandings of repair in several contexts (e.g. tikkun ha-olam, moral repair, archival repair, narrative repair, building repair, and automotive repair) and to compare these understandings of repair with the closely related practices of building restoration and ecological restoration. I then draw these insights together in Chapter 2 to provide an account of repair generally, in which I claim that repair is the process of mending damage that presents itself as a rupture or impairment in how an individual(s) or community has used an object(s) and would continue to use an object(s). Repair requires making an object(s) that has a distinctive past history of use ready for reliable use again by a particular individual or community as he, she, or they have and continue to exist against a temporal horizon of past and future. This process and result, though, requires that certain questions and issues be addressed along the way, and

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"reparative justice" and "restorative justice"). Alternatively, Lindemann (2001) describes the ways in which narrative identities can be damaged by oppressive and dominating forces and the subsequent need for alternative narratives (counterstories) that are capable of repairing the damage to a person or group's identity. Yet, in each of these an explicit account of repair is lacking. Instead, each seems to assume an unarticulated understanding of "repair" before then talking specifically about a kind of repair ("moral repair," "narrative repair") directed either at relationships between persons or at narratively structured identities.

these constitute a distinctive orientation and framework for the repairer such that repairs can ultimately be distinguished from mere replacements. For example, I suggest that repair involves:

1. Careful study and identification of the damage done;
2. Investigation of the cause of the damage and devising appropriate solutions that account for this cause so that an object can be *reliably* used again;
3. Understanding the materials under consideration and the constraints these impose on repairs that avoid further damage;
4. Consideration of how an object has been used by an individual and community and will be used in the future;
5. Fitting the object back into lived relationship with an individual or community, which will involve attending to the damaged sense of trust/reliance between an individual and some object(s);
6. A posture of humility that considers the particularity of the damage done and also admits a certain amount of fallibility in repair and thereby strives to make room for necessary, future repair work.

With this general understanding of repair in place, I set the groundwork in Chapter 3 for a responsibility to engage in certain kinds of repair work by offering an account of human persons as dependent and situated thinking creatures. This conception of persons draws on recent work in feminist moral philosophy (Kittay 1999; Lindemann 2002, 2009; Young 1997), as well as in the philosophy of mind on situated cognition (Rowlands 2010; Clark 1998, 2004, 2008a; Sterelny 2003, 2010). I argue for this conception of persons by showing its descriptive superiority to an alternative conception of persons as hyper-individualistic, brainbound thinking things whose relationship to objects is framed in terms of more strictly pragmatic, as opposed to epistemic, purposes.[2, 3]

Supposing that we are dependent, situated thinking creatures: to what ends do we leverage our situated thinking processes? Kirsh and Maglio (1994) consider how expert Tetris players use situated thought to think faster and compete more effectively when playing the game Tetris. Andy Clark and David Chalmers (1998) consider how an imagined individual Otto (who has Alzheimer's disease) might use situated or extended thought processes to remember important information (such as the location of an art museum) that allows him to carry out his desires and plans. Ed Hutchins (1995) examines how pilots use situated thought processes to perform complex calculations necessary for landing an airplane. This question—to what ends do we leverage situated thinking processes—is important because it can affect how we understand the wrong done when the built environment or a specific technology that is used in situated thought processes is damaged. In Chapter 4 I offer my own contribution to this ongoing discussion by exploring how situated thought processes can be leveraged for the purposes of achieving

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[2] This distinction between epistemic and pragmatic purposes is based on work by David Kirsh and Paul Maglio (1994), who set forth a distinction between epistemic actions and pragmatic actions based on their empirical analysis of expert Tetris players. Pragmatic actions are actions that are intended to bring one physically closer to a goal (e.g. purchasing plane tickets and boarding a plane for a vacation in France), whereas epistemic actions are actions that are performed in some physical space and often with various artifacts to directly affect aspects of internal, mental processing. Epistemic actions, according to Kirsh and Maglio (1994, 513-14), are external "physical actions that make mental computation easier, faster, or more reliable."

[3] I adopt the term "brainbound" from Clark 2008a.

a measure of personal autonomy.

Diana Meyers (2004) describes personal autonomy as the ability to exercise control over one's life through programmatic decision-making (i.e. How do I want to live my life?) and episodic decision-making (i.e. What do I really want to do now?). But to answer these questions authentically, conscious of the quartet of threats (social pressure, externally applied coercion, internalized cultural imperatives, and individual pathology) to making free and intentional plans for oneself, requires a repertoire of skills that enable a comprehensive survey and analysis of options, self scrutiny of feelings, values, goals, and the ability to apply and act on these reflections (Meyers 1989, 2004). This repertoire of skills (what Meyer's calls "agentic skills") includes, introspection skills, communication and listening skills, memory skills, imagination skills, analytical and reasoning skills, self-nurturing skills, volition skills, and interpersonal skills. An individual then can be more or less autonomous based on his or her ability in using these various agentic skills to address important questions such as: How do I want to live my life? What do I really want to do now? In Chapter 4, then, I explore how situated cognitive processes can constitute various agentic skills that are necessary for achieving personal autonomy. Sometimes then, when the built environment or specific technologies utilized in situated thought processes are damaged, an individual's skillful practice of personal autonomy can also be compromised. To account for this particular form of damage (namely damage to a person's autonomy competency by way of important, broken technologies), I introduce a more specific instance of repair work that I term "cognitive-agentic repair."

I define cognitive-agentic repair as the mindful mending of agentic skills/autonomy competency by way of those constitutive cognitive processes that are situated amidst objects and arrangements of objects, often in particular material spaces and places (e.g. a home or workplace). Importantly, cognitive-agentic repair does not only target the broken technology or arrangements of technologies, but instead also aims to address the relationship of reliance or trust between a person and the object. To carry out a complete cognitive-agentic repair of the technologies requires attending to both human persons and artifacts as they are bound together by the act of cognitive processing leveraged for the purposes of achieving a measure of personal autonomy.

In my view, a responsibility to engage in cognitive-agentic repair presupposes conceptualizing persons as dependent, situated thinking creatures, whereas a responsibility to merely replace damaged or lost objects with similar ones presupposes conceptualizing persons as hyper-individualistic, brainbound thinking things. In as much as persons are more accurately understood as dependent, situated thinking creatures, cognitive-agentic repair picks out the more fitting moral responsibility in certain circumstances. As such, I argue that when either intentional or unintentional damages are caused to those objects and environments that individuals utilize for cognitive processing and agentic skills, there is a prima facie responsibility to attempt cognitive-agentic repair so as to support the possibility of personal autonomy.

Chapter 4 serves to advance conversations in moral philosophy by pointing out an implication of a defensible conception of the kinds of thinking creatures that we are. Because the scholarship on extended/embedded/situated cognition is still a relatively young research program in philosophy and the cognitive sciences, little has been done to figure out the ethical implications of this research (see Hanson 2008; Levy 2007; Cash 2010; Sneddon 2011). By grounding my account of cognitive-agentic repair in this research, I show how models of situated cognition might alter and inform ethical theory and practice.

Chapter 5 shifts focus to consider how the concept of cognitive-agentic repair can and should function as a standard by which to design, implement, and select technologies that people use or might use to extend or embed cognitive processes within their built environments. I argue that given a prima facie responsibility to engage in cognitive-agentic repair, we should ensure that the technologies in need of repair are in fact capable of being repaired. This involves various persons and groups of people designing, implementing, and selecting technologies that *at least* allow for the practical possibility of cognitive-agentic repair. However, many modern technologies do not allow for or discourage the practical possibility of repair generally and cognitive-agentic repair more specifically. I claim then that it will be necessary to design, implement, and select technologies *differently*, namely according to the standard of cognitive-agentic repair. Cognitive-agentic repair can then serve as a useful ethical standard by which to develop and adjudicate amongst the tremendous number of technologies available for everyday use and appropriation into pragmatic and epistemic routines.

This conclusion is important because, while humans have always been technological creatures, modern technologies have dramatically amplified and constricted human actions in novel ways. The Internet, for example, represents a constellation of technologies that have substantially increased the quantity of information available to people while also introducing a new, global space in which to communicate and carry out hyper-public actions that have the potential for profound and extensive consequences. The advent of increasingly ubiquitous smartphones (mobile phones with internet access and a suite of applications or apps that enable an array of functions beyond those of a simple telephone) amounts to a powerful, relatively cheap, mobile personal computer that can be placed in a pocket (a considerable shift from the room sized computers of the 1940s or even the desktop computers of the 1980s through the 2000s). Given such examples, we are faced with the question: what ethical concepts and distinctions might be deployed to address modern technologies that considerably transform human actions? Chapter 5 offers one example of a novel concept, namely cognitive-agentic repair, which can make some progress toward answering that question. A commitment to the possibility of cognitive-agentic repair provides a means by which to more effectively regulate parts of the socio-technological milieu of the 21st century.

In the concluding chapter of the dissertation (Chapter 6), I demonstrate how my account of cognitive-agentic repair might be applied to a particular technology: home-based telemedical/telehealth technologies (i.e. bi-directional video links, wireless monitoring devices, location sensors, etc.). I examine telemedical/telehealth technologies from two vantage points concerning repair: (1) the ways in which telemedical technologies can facilitate cognitive-agentic repair and (2) the need to construct telemedical technologies to be reparable. By considering the ways in which telemedical/telehealth technologies can facilitate cognitive-agentic repair, I introduce a novel, ethical argument for the use of home-based telemedical technologies. By considering the ways in which telemedical technologies should be reparable, I further introduce helpful criteria that serve to guide the design, implementation, and selection of telemedical technologies, which are sometimes utilized in cognitive processes and various agentic skills for the purposes of achieving more autonomous decision-making.

This final chapter serves a number of important functions. It offers a means by which to test whether my concept of cognitive-agentic repair can be applied to specific technologies, and it begins the work of translating the theoretical portions of this project into concrete applications that can be used by different people in a number of settings, such as in health care. It also offers an original, ethical analysis of an important technology that has the potential to address some of the population, economic, and political stresses that are facing the health care system in the United States.

Before turning to the first chapter, a reflection that can serve as a beginning to this inquiry will be useful. In his poem, “Mending Wall,” Robert Frost (1969) describes two neighbors who meet in the springtime to mend the holes in the stone fence that divides one property from the other. During their repair work, one neighbor remarks, “Good fences make good neighbors.” On its own, this statement might seem to affirm a kind of reclusive individualism in which we are all better for leaving one another and our property alone. But in the context of the poem, in which Frost sketches the regular work of collaborative repair that this wall requires, we gain a different insight. The sign of a good fence is not its indestructability, but rather that it is marked by the persistent possibility and practice of mending. Walls that require and allow for mending make good neighbors. The work of mending or repair, importantly, can draw people together into deeper relationship with one another in which they are more responsive to one another's needs while also still recognizing the individuality of each person. This project endeavors to uncover some of the richness of repair practice as we strive to better understand and respond to the wounds and brokenness in one another's lives and forge life together.

CHAPTER 1

A PHILOSOPHICAL INVESTIGATION OF REPAIR PRACTICES

> Consider, for example, the activities that we call ‘games.’ I mean board-games, card-games, ball-games, athletic games, and so on. What is common to them all?- Don’t say: “They *must* have something in common, or they would not be called ‘games’ – but *look and see* whether there is anything common to all. – For if you look at them, you won’t see something that is common to *all*, but similarities, affinities, and a whole series of them at that. To repeat: don’t think, but look!
>
> —Ludwig Wittgenstein (|1953| 2009, 66)

Introduction

There is no shortage of references to repair in our present culture—automotive and mechanical repair, genetic repair, conversation repair, emotional repair, relational repair, moral repair, narrative repair, building repair and archival repair. If we include the related concept of restoration, the references multiply—artwork restoration, ecological restoration, and restorative justice. In short, we seem to be, as Elizabeth Spelman (2002) terms it, “homo reparans.” We are creatures that both engage in repair and are often in need of some kind of repair, and as such, the practice of repair permeates our daily lives in one form or another. But if asked the questions, what unites these diverse instances of supposed repair, what makes automotive repair and relational repair both instances of repair; clear answers are not readily available. Instead, we often employ an “I know it when I see it approach to repair.” While that approach might have practical utility, an unarticulated understanding of repair prohibits a complete and transparent accounting of the concept and practice of repair, allowing ambiguities to persist and possibly crucial dimensions and distinctions to go unexplored.

For instance, is repair a strictly conservative endeavor or does it also involve a progressive or creative element as well? According to the Oxford English Dictionary (OED 2009), the modern term “repair” is derived from the classical Latin “reparare,” where “re-” means “again” and “-parare” means “to make ready" or "set in order.” Thus, a common understanding of repair involves making some object or thing ready for use again following damage that interferes in the performance of an object. This would seem to give the concept and practice of repair a more conservative cast, that is, it involves a return to some previous state of things. But if a supposed repair simply returns an object or relationship to a previous state of readiness in which the same or similar damage results soon thereafter, is that a genuine repair? Is that a successful or good repair? The Latin “parare” is etymologically related to the term “pare,” which means “to trim by cutting away rough or superficial edges" (OED 2009, 2005). Thus “re-pare” (to trim again) is usefully suggestive in that it introduces the sense of specifically removing or modifying parts of an object in order to make it ready again. This act of “re-paring” is captured especially well in a description of archival book repair (Cunha and Cunha 1971, 163).

1. Select a mending paper to match damaged sheet in weight, tone, texture…
2. Pare edges of damaged paper with a surgeon’s scalpel.
3. Lay damaged paper on repairing paper.
4. Tear out the repairing piece 1/16th inch outside of the folder mark.
5. Turn the repairing piece over and pare the edge with the scalpel.
6. Apply paste to both pared edges, then place them together, rub with a bone folder and let dry.

7. When dry, tone if desired.

On this approach, repair is not strictly conservative, meaning it does not require an exact return to a previous state of readiness, but instead might involve some degree of skillful modification in order to adequately address the damage at hand.

What is the relationship between the terms “repair” and “restoration?” In the OED (2009), one definition of “repair” is “To restore (a damaged, worn, or faulty object or structure) to good or proper condition by replacing or fixing parts; to mend, fix.” Similarly, one definition of “restore” in the OED (2010) is “To build up again; to re-erect or reconstruct. Now: spec. to repair and alter (a building, or part of a building) so as to bring back something like the original form or condition.” Each definition references the other, suggesting that these terms might be, in certain contexts, synonymous. Indeed, these terms are sometimes used interchangeably. A book entitled *Earth Repair* (by Marcus Hall, 2005) more often utilizes the term “ecological restoration” than it does "repair." Margaret Urban Walker (2006) sets forth a rich account of what she terms “moral repair,” but then binds it deeply with discourses on “restorative justice” or otherwise talks frequently about moral repair as the restoration of hope and trust. It is not clear precisely where the concept of restoration ends and repair begins.

And yet, the phrase “to repair and restore” is often used without any intention of being overly redundant. Despite the frequent association of these terms there does seem to be an incompletely articulated distinction between them as well. Confusingly, though, some scholars refer to restoration as integral to the general work of repair (e.g. Katz

2000, 44; Forsyth 2008, 2), while others refer to repair as integral to the general work of restoration (e.g. Spelman 2008, 246 note 17; Read and Meyer 2000, 4).

A tentative distinction between "repair" and "restoration" is that restoration is especially concerned with the form or appearance of the original object, while repairs focus on continuity of function with the original object. Thus we might meaningfully distinguish between the repair of an automobile and the restoration of an automobile. The former is aimed at making a car drivable again, while the latter is focused on re-instating a specific, past look or appearance. However this suggests that the form of an object can be clearly demarcated from the function of an object. Form, though, is often deeply bound up in function; the form of an object both affects the way in which the object functions and especially the way in which the object is appropriated and used for a range of functions by humans. Therefore, even if repair is primarily understood as concerned with the function of an object, it cannot ignore the form/appearance of an object either since a commitment to function would also entail some commitment to the form/appearance of the object as well. The tentative distinction then, while not completely invalid, nonetheless loses some explanatory value.

Perhaps a different distinction can mend the explanatory gap. Repair is local in scope, while restoration aims at bringing back a sense of wholeness or completeness. Thus we might meaningfully distinguish between performing repairs on discrete parts of a building and restoring the building in its entirety, or mending portions of a painting and restoring the entirety of a painting. But does a repairer aim at anything less than completeness when she strives to put some object back in order again or make it ready again, such as when a seamstress mends a torn shirt? No, the repairer, as much as the restoration manager, aims to bring back a sense of completeness and wholeness as well. The difference concerns what is designated as the object of repair versus the object of restoration. While there might be a tendency to refer to certain objects as objects of repair (windows, doors, frames) and others as objects of restoration (paintings, buildings, ecosystems), these objects, it seems, could just as well be understood interchangeably as objects of repair or restoration.

In summary, repair, while abundant in practice, has often lacked precision as a defined term and important questions about the scope and goals of repair remain unclear. This is complicated further by the close association between repair and restoration, which nonetheless resist being identified as the same thing. In short, to more accurately and fully plumb the resources of repair practice, the term "repair" itself must be more clearly specified and distinguished.

Spelman's Account of Repair

Elizabeth Spelman (2002) offers one of the only sustained, philosophical considerations of the concept of repair. It is therefore worth summarizing some of her insights here about the concept and practice of repair before moving on to further advance the philosophical analysis of repair in the remainder of the chapter. Spelman (2002) begins her account by acknowledging that there is a family of repair activities, which includes repairing, restoring, renovating, reconciling, redeeming, healing, fixing, and mending. These activities are unified by the "aim of maintaining some kind of continuity with the past in the face of breaks or ruptures to that continuity. They involve returning in some manner or another to an earlier state… [B]oth the repairer and restorer want to pick up a thread with the past" (2002, 4-5). For Spelman, the repairer is to be distinguished from creators, destroyers, noninterferers, replacers, and bricoleuers (2002, 5). Of course, though, this initial description of repair raises critical questions: what precisely is the nature of this return to an earlier state; what is involved in maintaining continuity with the past? To try to address these questions, Spelman (2002) explores the repair activities of three individuals: Willie the automobile repairperson, Fred the motorcycle restorationist, and Louise the art restorer.

Willie is an adept mechanic working in rural, upstate New York. Although he specializes in repairing Saab automobiles, he will try to repair just about anything that is brought into his shop, and he is usually very successful with these repairs. Willie's goal is simply to get cars and other machines back up and running again after they have stopped working for one reason or another. To that end, Willie keeps a ready supply of old parts laying around his shop and yard just in case he might be able to use them to improvise a solution for a current job. Significantly, each job is different and unique, and Willie must often employ keen powers of diagnosis and imagination in order to understand any given problem and devise fitting solutions. A crucial part of Willie's repair work is his effort to put himself in the place of the engineer who first built the damaged part so that he can understand the originally intended function (Spelman 2002, 11). From this position, Willie is often also able to detect an engineering flaw that led to the present damage, and thus his work often leads to modifications in the original design in order to avoid the same damage in the future. In this manner, Willie exemplifies the way in which repair can often involve remediation, that is the removal of some flaw or shortcoming in order to make some object(s) ready for use again (Spelman 2002, 12).

In contrast to Willie, Spelman (2002) introduces Fred the motorcycle restorer. Fred is working to put an antique Indian Chief motorcycle back in mint condition. Although Fred's work involves fixing damage to the bike, it also involves the additional commitment to put the bike in order so that it resembles its original condition (Spelman 2002, 13). Fred is therefore especially concerned with issues of authenticity—that is, using the exact same types of parts that would have been first used in the manufacture of the bike so as to create an authentic Indian Chief motorcycle (Spelman 2002, 14). Fred does not take liberties with what parts he uses, but instead strives to maintain strict, historical fidelity to the original Indian Chief motorcycle design (Spelman 2002, 19).

As a third distinctive contrast, Spelman (2002) considers the work of Louise who is a painting conservator at the Stedilijk Museum in Amsterdam. Part of Louise's work involves the restoration of paintings where the damage is neither too small nor too large (Spelman 2002, 16-17). As an art restorer, Louise collaborates extensively with other experts in art conservation and art history that help to ensure that any restoration work maintains a strict fidelity to the original version of the painting. Amidst this work, Louise is faced with the difficult task of 1) ensuring that any work done on the painting is apparent to future restorationists, 2) any restoration work must be reversible, and 3) the work of art restoration should be a kind of "invisible mending" that is not obvious to the spectator's eye and therefore does not disrupt the artist's intended experience of the painting (Spelman 2002, 16).

In the next several paragraphs, I summarize and organize Spelman's (2002) comparison and contrast of these three figures with reference to the useful categories of 1) constraint, 2) authorship, and 3) the relationship to time passing. Beginning with constraint, Willie has succeeded in his repair when the car can once again perform its function of transporting people and goods safely; his allegiance is to the "road worthiness of the car and norms of mechanical efficiency," which means that he may sometimes make improvements on the manufacturer's original design if an original flaw is causing damage or inoperability (Spelman 2002, 18). As such, for Willie, the "look" of a car is not especially important. Fred's restoration work, though, is more constrained by a commitment to the original historical condition of the object. Fred has a deep allegiance to the original design of the object, and thereby does not introduce substantial modifications in the way that Willie might (Spelman 2002, 18-19). Louise and her fellow conservators are even more constrained in their restoration work. Unlike Fred's restoration project, they cannot dismantle and rebuild a painting, but instead must maintain strict fidelity to the singular work of a particular artist by doing as little work as is needed to remove only the worst ravages of time.

Per the issue of authorship, Willie and Fred's repair and restoration work can and often is properly recognized as their work (Spelman 2002, 20). Willie's amalgamation of different parts and style in pursuit of a particular function are often unmistakable. Similarly, although Fred is deeply loyal to the original design of the motorcycle, it is his handiwork in the rebuilding process that will ultimately be on display to others. Yet, Louise and her fellow conservators are supposed to perform "invisible mending" that is not immediately apparent to the spectator's eye (Spelman 2002, 16, 23). It is not the handiwork of Louise that spectators are supposed to admire, but rather the original artist that created the painting (Spelman 2002, 20). Thus, a range of different degrees of recognized authorship opens up depending on the type of repair and restoration work.

Each work of repair or restoration is further distinguished by its relationship to the passage of time. Although Willie strives to restore some object's past function, he does not try to disguise the effects of time's passing. Instead, his repairs may be conspicuous enough to even call attention to the effects of time, and the need for adjustments along the way. Fred and Louise, though, while acknowledging that time cannot stand still, nonetheless strive to remove some of the edge or harshness from the passage of time. Even if an object cannot be restored to its exact, original condition, proper knowledge, skills, and materials can undo or at least diminish the visible damage done (Spelman 2002, 23-24). Thus, in various ways, the restoration work of Fred and Louise attempts to offer the consolation that time need not pass so quickly or be so severe a master (Spelman 2002, 24).

Although Spelman does not make sharp distinctions between repair and restoration, and instead appears to position the range of repair and restoration activities on a common spectrum, we nonetheless can begin to see some predominant features of repair and restoration. While both repair and restoration are responses to damage or inoperability and are concerned with preserving some connection to the past, Spelman positions repair as more concerned with preserving the function of some object while restoration is especially concerned with the appearance and composition of the original object. Consequently, repairs (epitomized by Willie's automobile work) are often less constrained by past design choices or the impulse to remove the severity of time's effects aside from interferences with the function of some object. Nonetheless, despite these differences, Spelman tends to see a broad family of repair activities that are more especially distinguished by their larger contrast with and position between the actions of wholesale creation and destruction. Towards the end of her account, we get at least a partial definition of repair in this more general sense, "Inventive as repair can be, it is not about creating original objects or even about keeping existing objects from breaking (that is maintenance), but about responding to the damage they have endured and finding a way to continue their existence in the aftermath of such damage" (Spelman 2002, 137). Spelman evocatively refers to this as the act of "devising paths of continuity" (2002, 137).

This is an insightful account of repair, and Spelman's work serves as an invaluable initial analysis of that concept and practice, but more work can be done to define precisely what is involved in the action/process of repair and what constitutes a successful repair. Following Spelman's pattern of using examples of specific repair practices, I also attend to a number of different conversations about repair and restoration (e.g. automotive repair, archival document and book repair, building repair, ecological restoration, Tikkun ha-Olam, narrative repair, and moral repair) to distill distinctive features and contrasts, which I then assemble and present as a systematic account of repair.

Automotive (Mechanical) Repair

Automotive repair and related types of mechanical repair (bicycle, aircraft, ship) often stand out as paradigm cases of repair. Here I return again to the example of Willie, the rural, auto-mechanic in upstate New York, who is described at length in Douglas Harper's (1987) rich sociological account of Willie and his repair shop, called *Working Knowledge: Skill and Community in a Small Shop*. In particular, I want to focus on three central aspects of automotive repair: 1) the contrast between rationalized repair and multidimensional repair, 2) the position of the repairer, and 3) repair as an instance of remediation.

A central theme in Harper's description and analysis of Willie's repair work is the contrast between increasingly rationalized repair and what I will term "multidimensional repair." Rationalized repair is distinguished by several characteristics (Harper 1987, 22-23):

- "More objective, less intuitive" (22)
- Deals with isolated, individual parts without awareness of the overall machine and the interlocking parts, functions, and principles that guide and shape the machine (22)
- Standardized through professional certification and formal training (relates to the increasingly objective nature of rationalized repairs) (22)
- Resembles modern assembly: a part is not fixed, but rather simply removed, and a new one is installed in its place (23)
- Increasingly de-skilled through the use of computerized trouble-shooting and standardized procedures for the range of possible computer diagnosed failures (23)

John Jerome (1977), in his account of rebuilding a worn-out Ford pick-up truck, also describes this increasingly rationalized repair in terms of merely replacing large assemblies of parts without any understanding of how the parts mesh with other parts of the machine. He writes,

> Auto parts stores not only don't want to do machine work…they don't want to sell parts. That is, they want to sell assemblies, bolt-ons; they want to exchange black boxes for you…Replace, don't fix. Perform surgery at the largest possible assembly point, and transplant. They sell units, not parts. (Jerome 1977, 60)

Matthew Crawford (2009, 2), a philosopher and motorcycle repair mechanic, echoes a similar diagnosis, "What ordinary people once made, they buy; and what they once fixed for themselves, they replace entirely or hire an expert to repair, whose expert fix often involves replacing an entire system because some minute component has failed."

Multidimensional repair, the kind of work that Harper (1987) attributes to Willie and other repair mechanics like him, strongly contrasts with rationalized repair work. In short, multidimensional repair is often guided by a deep understanding of how particular machines and materials work, and hence repairs do not always follow standard manuals, but instead the particularity of the damage at hand often elicits creative, improvisatory solutions. Instead of replacing systems or large assemblies of parts, multidimensional repairs address individual parts within the larger system. Significantly, these multidimensional repairs exemplify a keen ability to recognize and interrogate the damage present in a machine or part of a machine, which might be assisted by a computer, but is not dependent on or subservient to a computer's analysis. This brings us to the issue of the position of the repairer.

Willie, as a highly skilled repair mechanic, often imaginatively reaches back into the past in order to explore the original engineer or designer's intentions in putting the machine together in a particular manner (Harper 1987, 127; see also Wiens 2013). This imaginative exploration is facilitated by his deep knowledge of the way in which materials function relative to one another and the basic mechanical principles that must be followed in order to achieve certain effects and functions. In this way, certain damage or causes of damage begin to come into view relative to a previous state of imagined functioning or completeness. Thus faced with the initial basic fact of a machine that is not working or is not working properly, the repairer tries to imaginatively shift their perspective to a past when the object did work and thereby they are able to more clearly recognize the damage at hand and the possible causes of that damage. The repairer modulates her position between the present and an imagined past.

Although the repairer might imaginatively project himself into the position of an original engineer, he is not necessarily bound to the pattern of the original manufacturing and design. This represents an important distinction between rationalized repairs and multidimensional repairs. As Harper (1987) and others observe, rationalized repairs increasingly resemble the rigid standardization of modern assembly processes. Once a part or collection of parts is diagnosed as damaged or inoperable, an identical part(s) is specified and used to replace the old one. This kind of repair is simply a process of re-assembly that is bound to the pattern set down by an original engineer. Willie, by contrast, will sometimes correct what he determines to be a flaw in the original design. For instance, after years of repairing Saab automobiles, Willie has found that the handle on the door of older Saabs is prone to breaking, and accordingly he has re-designed it and manufactured an alternative handle that he now installs on cars with the older, broken handles. Significantly, Willie's repair then does not merely involve replacing the broken handle with the same type of handle, which he knows is going to result in the same kind of damage again, but rather, he modifies and installs an alternative handle that avoids the shortcomings of the older model. This is important because it reveals the way in which repair, especially what many would regard as a successful repair or good repair, involves a certain amount of remediation, that is the correction or removal of a past fault that is causing problems now and might cause problems that interfere with future, ongoing use.

Archival Repair

Substantial archival repairs have taken place in the United States since the late 1800's (Kimberly 1938). Since that time, a tremendous number of repair methods and materials have been employed to keep in existence books and documents of historical value that have suffered from staining, fading, cracking, rotting, abrasions, smearing, buckling, holes, and tears. Amidst the work and conversation around archival repair, a number of important insights can be gleaned regarding the ways in which past damage, future use, the nature of the object, and the need for future repairs constrain, shape, and guide repair efforts.

In their extensive review of the literature and methods surrounding the conservation and repair of archival materials, George and Dorothy Cunha (1971, 141) make a passing, but significant, remark, "The amount of repair or restoration authorized to return research books to durable usability should primarily be influenced by the curator's knowledge of the expected use of the books." Based on this remark, we begin to see that repair and restoration work can be more or less extensive. The extensiveness of the repair varies with the distance between the current state of damage and a future state of durable usability. Importantly, durability and usability are held up as central guides to the work of repair. However, these are not fixed concepts. Instead, the requisite durability of some object should be assessed by those who know how, by whom, and how often an object will be used. In this manner, the future use of an object places important constraints on the manner and extent of repair.

However, it is not merely the future durable usability of the object that constrains the repair, but also past use and present damage. As the Cunhas (1971, 144) observe, any repair work should begin with a careful examination of the object damaged, and in the case of archival documents, should consider:

1. The history of the document
2. How was it stored over the years?
3. What is the character of the original binding?
4. Evidence of rebinding or previous repairs
5. The physical condition of materials

Answers to these questions determine what in fact is damaged, the scope of necessary repairs, and the manner in which repairs should proceed. The work of examining the object and suspected sites of damage is especially significant because different types of damage will warrant different methods of repair. Moreover, those methods of repair will be further constrained by the materials on which the repairs are to be done (for example, vellum is to be cleaned and mended differently than leather or paper).

Of course, the materials do not literally constrain the repairer's work. Instead, repairers are aware that additional damage may result from attempts at repair that are insufficiently attentive to the nature and range of damage as well as the nature of the material to be worked upon. Thus to the extent that actual or good repair work does not cause further damage, there is an imperative to do no further damage and, thereby, work creatively within the constraints imposed by the nature of the object and the damage at hand. As Roger Ellis (1951, 1), observed, "There is a great deal more in the repair of archives than the simple application of paper and paste; the whole process of repair may defeat its own object unless the true nature of the archive—and hence of the repair which it is to undergo—is fully understood." There is a riskiness in repair efforts such that if they are not undertaken properly in light of certain constraints, they can destroy the very object of repair.

Appropriately, Roger Ellis (1951) introduced a set of influential principles of archival repair (summarized in Baynes-Cope 1994, 18).

1. No process of repair shall be allowed to remove, diminish or obscure in any way the document's value as evidence.
2. No process of repair shall be used which would in any way damage or weaken the materials of which the document is made.
3. The process of repair should not interfere in any way with any subsequent treatment that the document may need.
4. The process of repair should not diminish in any way the aesthetic appearance of non-archival material.
5. No process of repair should be irreversible.

The first of Ellis' principles observes the extent to which the object of repair itself exerts significant constraints on repair work. In this case, it is the document's value as historical evidence that shapes the archivist's repair efforts. In short, to ensure the continued existence of some object requires an understanding of what that object is and how it functions.

The second principle affirms what has already been stated—that good, proper, and/or successful repairs do not cause further damage, especially damage that imperils the continued existence of the object. The fourth principle is interesting in that it acknowledges that at least some repairs (e.g. archival repair) do not simply focus on a basic understanding of the object's function (e.g. acting as historical evidence), but also the way in which aesthetic features (bindings, sewing techniques, paper type) are to be considered amidst repair work. I will return to this insight later in this chapter.

The third and fifth principles represent a central insight about repair—namely, the work of repair is deeply conscious of the flow and effects of time. As Spelman (2002, 126-134) observes, creators introduce new objects, fully formed, and initiate a timeline, while destroyers end an object's existence, thus terminating a timeline. Repairers, though, interact with objects between the terminal points of creation and destruction (Spelman 2002, 126-134). More especially, repairers have the special task of ensuring the ongoing existence of some object in the face of damage that has impaired the ongoing use of an object. This is significant because repairers, conscious of their role, are vividly aware of the relentless effects of time on objects and the ongoing need for repair, not only the present repair work but the need for repairs in the future as well. Thus, the present repair work is framed by a larger understanding of a need for future repair work. This introduces additional constraints on the nature of good or proper repair work; the present repair should not interfere with necessary future repairs or conservation treatments. As such, present repairs should be reversible, both because the success of future repair or conservation treatments might require modifications to the present repair, and also because innovations in materials and methods might allow for better repairs to be carried out in the future thus ensuring the more durable, ongoing use of some object.

Building Repair and Restoration

Perhaps the most helpful conversation about repair can be found in the debate surrounding building repairs and restorations during the 18th and 19th century in Europe. I am indebted here to Stephan Madsen's (1975) comprehensive history of this debate. Beginning with the architectural restoration projects of James Wyatt in 18th century and extending through those of Viollet le Duc and others in the 19th century, a fierce debate concerning the proper aims of ancient building restoration, repair, and preservation ensued. On one side of the debate were architects and thinkers, such as Viollet le Duc and James Wyatt, who argued that the proper goal of any building restoration project was to restore it to its original condition and ignore any modifications to the building that had been made in the intervening years between the building's initial creation and its present state of disrepair (Madsen 1975). For many of the architectural restoration projects occurring in Europe at this time, this meant a strict return to the medieval Gothic style of building construction (Madsen 1975).

In the 19th century, Viollet le Duc (1875, 9) offered an iconic definition of building restoration, "The term restoration and the thing itself are both modern. To restore a building is not to preserve it, to repair, or rebuild it; it is to reinstate it in a condition of completeness that could never have existed at any given time." Le Duc's definition is notable for at least two reasons. First, he not only believed that the aim of a proper restoration was the return to the original condition of the building, but the perfection of the architectural style that guided the design and construction of the original building. In this manner, le Duc epitomized what Robert Wicks (1994) called the "Platonic" model of restoration practice, in which the goal is "to restore the work [building] in accord with a conception of its idealized, perfected appearance" (166). Secondly, it is clear that le Duc thought that the work of restoration was distinct from the work of repair. This distinction between the work of repair and restoration becomes even clearer in the writings of those who were vehemently opposed to the kinds of restoration work that architects like Wyatt and le Duc were engaged in.

Throughout the 18th and 19th centuries there was a crescendo of voices critical of the popular work of restoration. John Ruskin (|1880| 1989) was among the more influential critics of restoration, he wrote "Neither by public nor by those who have the care of public monuments, is the true meaning of the word *restoration* understood. It means the most total destruction which a building can suffer… Do not let us talk then of restoration. The thing is a lie from beginning to end" (194, 196). Ruskin's criticism of restoration would serve as inspiration for William Morris, who in 1877 formed the Society for the Preservation of Ancient Buildings (SPAB), a group of people who were staunchly opposed to restoration practices that led to the willful destruction of portions of buildings that did not cohere with the supposed original style of the building (Madsen 1975, 51). At its founding, Morris (|1877| 2009) issued a manifesto for SPAB, a portion of which is worth quoting at length.

> In early times this kind of forgery was impossible, because knowledge failed the builders, or perhaps because instinct held them back. If repairs were needed, if ambition or piety pricked on to change, that change was of necessity wrought in the unmistakable fashion of the time; a church of the eleventh century might be added to or altered in the twelfth, thirteenth, fourteenth, fifteenth, sixteenth, or even the seventeenth or eighteenth centuries; but every change, whatever history it destroyed, left history in the gap, and was alive with the spirit of the deeds done midst its fashioning. The result of all this was often a building in which the many changes, though harsh and visible enough, were, by their very contrast, interesting and instructive and could by no possibility mislead. But those who make the changes wrought in our day under the name of Restoration, while professing to bring back a building to the best time of its history, have no guide but each his own individual whim to point out to them what is admirable and what contemptible; while the very nature of their task compels them to destroy something and to supply the gap by imagining what the earlier builders should or might have done.

Morris, like Ruskin, regarded many of the 18^{th} and 19^{th} century architectural restoration projects as forgeries that had tragically lost much of their historical nuance and sophistication through the overly simplistic and biased restoration philosophies and methodologies of popular architects at the time. Significantly, though, Morris, and Ruskin before him, did not advocate a policy of strict non-interference in the ongoing life of a building. Instead, each of them advocated a strategy of both the ongoing protection of ancient buildings against damage and, when necessary, modest repairs. Ruskin (|1880| 1989, 196) writes,

> Watch an old building with an anxious care; guard it as best you may, and at *any* cost, from every influence of dilapidation. Count its stones as you would jewels of a crown; set watches about it as if at gates of a besieged city; bind it together with iron where it loosens; stay it with timber where it declines; do not care about the unsightliness of the aid: better a crutch than a lost limb; and do this tenderly and reverently, and continually, and many a generation will still be born and pass away beneath its shadow.

For Ruskin, repair, has the distinctive quality of a kind of mending in which the remnants of a damaged (torn) building are pulled together again so as to provide glimmers and glimpses of magnificent and instructive ancient buildings. The repairs are not necessarily invisible, instead they may be as conspicuous as an individual using a crutch after breaking a leg. Indeed, the visibility of the repair can give it particular value. As Morris (|1877| 2009) noted in the passaged quoted earlier, "The result of all this [repair, modifications, additions] was often a building in which the many changes, though harsh and visible enough, were, by their very contrast, interesting and instructive and could by no possibility mislead." Precisely because of a visible record of repairs, some buildings gained depth that garnered additional interest and provided valuable opportunities for instruction. More still, visible repairs do not risk misleading any spectator of the building by trying to deny or occlude the effects of time completely, but rather highlight the passage of time and write the saga of time's effects on the building through the contrast between any given repair and the glimmer and glimpse of a past architectural feature or building material. In the background, we can discern Morris's concern that the comprehensive demolitions and revisions that were taking place under the name of restoration in fact were deeply deceptive about the actual nature and history of buildings. As Ruskin proclaimed, "The thing [Restoration] is a Lie from beginning to end" (1989, 196). By contrast, to avoid deception and confusion, Morris and Ruskin both advocated repairs that had the particular role of assisting and supporting the building's continued existence as a composite object that reflects the work of many hands over many years.

The repairs that Ruskin advocates are further characterized by attitudes of tenderness, reverence, and diligence. Thus, repair, at least as it is understood by individuals like Ruskin and Morris, is characterized not only by a particular kind of product or result, but also by a particular disposition that shapes and guides the way an individual recognizes damage and the range and nature of acceptable solutions to mend the damage. Where restoration practices were often characterized by a certain boldness, even brashness, in which portions of a building were simply ignored or destroyed in pursuit of a seemingly complete vision of a past condition, a strategy of "sympathetic repair" (Forsyth 2008) offered a clear alternative. On this alternative approach, a deep respect for the composite qualities of ancient buildings combined with a desire to see the buildings live on called for a tender and modest touch that performed minimal and local repairs that were attentive to the particular character and qualities of the building and its often complex historical record (Forsyth 2008).

A Coda

Interestingly, the building restoration/repair debate of the 19th century was revived in somewhat ironic fashion in the 20th century. In 1860, Viollet le Duc embarked on an ambitious restoration project on Saint-Sernin basilica in Toulouse, France, which had been constructed over the course of four centuries and therefore exhibited multiple architectural styles (Parent 1990; Edelman 1990). During the restoration, le Duc transformed significant portions of the building in an attempt to achieve a more unified style, thereby perpetrating what Michel Parent (1990) called a "metamorphosis" of the building (see also Edelman 1990). Then in the 20th century (in 1979) a program was approved to remove portions of le Duc's restoration of Saint Sernin, and, instead, to restore the basilica to its condition prior to 1860, before le Duc began his restoration work (Edelmann 1990). However, in the midst of this de-restoration project, so to speak, Viollet le Duc's work became popular again and some argued that features of his restoration work should actually be preserved and maintained instead of being removed (Parent 1990; Edelman 1990; Russell 1988). Thus, where Viollet le Duc had been quick to engage in ambitious building restoration projects that often transformed the buildings and discarded features that exhibited conflicting architectural styles, now something closer to Morris and Ruskin's strategy of preserving, maintaining, and repairing buildings in the diversity of their history and styles was being applied to le Duc's own restoration work. Nonetheless, the plan to restore the building to it pre-1860 proceeded (Edelmann 1990).

Ecological Restoration and Repair

The concern about the boldness and occasional brashness of restoration practice can be found in a similar debate that has taken place in the late 20th and 21st centuries regarding the possibility and permissibility of ecological restoration. In 1982, Robert Elliot wrote an influential essay in which he argued that ecological restoration projects—"the practice of re-creating ecological systems that have been previously destroyed, largely because of anthropogenic causes"—were merely an attempt to fake nature and resulted in a product akin to an artwork forgery (Elliot |1982| 2003; quoted definition of restoration from Light 2005, 154). Erik Katz, in the spirit of John Ruskin, deepened and extended Elliot's claims, summarily calling ecological restoration the "big lie" (1992).

According to Katz (1992, 1996, 2000), nature is an autonomous, self-generating system that, as such, has value independent of humans, and, accordingly, the human re-creation or repair of a portion of the natural world merely produces an artifact (a product of intentional human design), which is distinct in ontological status and deficient in value relative to nature as an autonomous, self-generating system. Katz (1992, 1996, 2000) went further though in claiming that restoration efforts that failed to acknowledge the profound difference in value between natural processes and human re-creations and repairs of nature exemplified a certain hubris and domination of nature, thus exposing them as morally dubious endeavors.

As Andrew Light observes, though, Katz's criticisms of ecological restoration are more accurately understood as criticisms of mitigation policies, whereby some damage to natural environmental features is permitted (e.g. for mining, logging, or transportation operations) as long as the natural features are either recreated after operations conclude or the natural features are replicated in another location (Light 2005, 160). Elliot (1997) himself has revised his original position in order to more sharply focus on the concern about the impulse to mitigate against present harms to the environment with the promise of restoration projects that claim to re-instate all of the original value of the natural system under consideration. According to Elliot (1997), defenders of mitigating restoration projects make the mistake of thinking that as long as all of the same or similar types of objects are put back in place, so that both the original and the restored environmental systems have all of the same intrinsic properties, then they are equivalent in value. That is, take a snapshot of the original ecosystem and take a snapshot of the restored ecosystem, and as long as they are identical then they are believed to have equivalent values (Elliot 1997, 80). But Elliot rightly points out that this snapshot approach to evaluating restoration projects misses the essential relational qualities that objects and systems have to other objects and events outside of themselves (1997, 80). The mitigating restorationist fails to account for the relational web of natural processes and historical events in which the original ecosystem existed in contrast to the very different web of human actions, intentions, and events that the restored ecosystem exists within. In short, mitigating restorationists are actually only offering ecological replacements that do not, in fact, restore the full value and qualities of the original natural system, because they do not acknowledge or attempt to integrate with the distinctive processes and events that led to the natural object or system prior to the damage. Similar to the discussion of multidimensional auto repair and rationalized repair above, the act of mere replacement is highlighted as a distinctive contrast to a good or complete repair or restoration.

Morris and Ruskin exemplified a similar concern for the failure of architectural restorationists in the 19th century to sufficiently appreciate and preserve the distinctive history and modifications made to ancient buildings across the centuries. In contrast to the work of building restoration, Morris and Ruskin advocated practices of preservation and repair that would acknowledge and seek to maintain the present ancient building in relationship to the whole of its historical development and all of its modifications along the way. Although, he does not adopt the terminology of repair, Eric Higgs (2003) seeks in, similar ways, to address the failings of some ecological restoration practice (e.g.

mitigating restoration that results in merely isolated replacements) by specifying better restoration practices. I elucidate Higgs (2003) proposal here because his account of focal restoration has deep affinities with the general account of repair that I will set forth.

Robert Morris, in the Manifesto for the Society of Ancient Building Preservation, makes the interesting remark that modest, incremental repairs are significant both because they pose less risk of misleading viewers of an ancient building than full scale restorations and also because they can prove instructive and interesting to viewers. That is, for Morris, modest repairs to a building 1) prevented the further harm of deceiving a viewer about the nature of the building and also 2) benefitted the viewer by increasing the aesthetic value of the building and/or assisting in a viewer's understanding of the building. Eric Higgs (2003) displays similar sentiments in his distinction between ecological restoration projects that attempt to hide or deny the role that humans have played in the process of assisting the recovery of an ecosystem and those that do not. Higgs argues that the design that human beings inevitably bring to any ecological restoration project should be acknowledged (2003, 274). In doing this, restoration projects maintain a certain transparency or honesty about their process, and also begin to make space for more clearly addressing and improving upon the design practices that shape and determine the process and product of ecological restorations.

Higgs (2003) further argues that human involvement in ecological restoration projects should not to be restricted to a specialized elite, but rather, should involve the skillful participation of local communities, which in turn also become part of the object of restoration as ecological processes and cultural practices are brought into conversation and reconciliation with one another. When such projects, what Higgs (2003) terms "focal restorations," are effectively carried out, ecosystems will be made whole (ecological integrity) with reference to the history of the place (historical fidelity) and local communities will be drawn into a deeper understanding of nature in a specific place. These focal restorations are contrasted with technological restorations in which the process of restoration is carried out by a certified and specialized group of professionals guided by the ideal of efficiency and the result of which is a highly polished product that is abstracted from a distinctive process in a specific place enriched by distinguishing cultural traditions (Higgs 2003).

Higgs follows the pattern of Morris before him. Not only do good ecological restoration practices, like good building repairs, strive not to cause additional harms (e.g. misleading a viewer about the nature of a building or ecosystem through time), but also they can bestow distinctive goods. On Higgs' approach, ecological restoration not only performs the obvious good of removing some ecological damage, but also achieves the good of inviting local community participation into the recovery and maintenance of an ecosystem and assisting the reconciliation of cultural practices and ecological processes. That is, ecological restoration does not simply return the ecosystem in approximate resemblance to some past condition and step aside for whatever may come, but, instead, strives to establish a particular, ongoing human relationship with the ecosystem that will hopefully, positively shape its future use through mutually sustainable interactions. Despite the fact that Higgs uses the term "restoration" to describe this process, it is this effort to not only put an object back in order but also to tend to the human relationship with the damaged object that I take to be a distinctive feature of repair. Unlike replacement, which simply puts the same or similar objects back into place, repair aims to integrate the object into a larger web of historical events and relationships.

Of course, much of this discussion about ecological restoration has been from a decidedly North American perspective, in which a strong binary exists between wild, untouched nature and human culture, and in which humans are a major threat to natural and wild areas. However, Marcus Hall (2005) argues that for much of human history, and particularly in Europe, humans regarded natural forces as the primary source of damage to the land, and, therefore, to restore the land meant applying distinctly human improvement to combat the disorder and destruction wrought by natural forces such as lightning, weeds, and drought. On this approach, the garden was held up as the ideal land type against which damage was measured. Increasingly, though, from the 19th century onwards, and particularly in North America, human agents were recognized as major sources of damage to the land, thus warranting less human intervention in ecological processes at times. Additionally, in contrast to the garden, untouched wilderness was held up as an ideal against which damage was measured. Hall (2005) usefully outlines three predominant approaches to restoration based on these divergent understandings of the damage to be addressed through restoration: 1) Maintenance Gardening, 2) Reparative Gardening, 3) Reparative Naturalizing.

Maintenance gardening seeks to bring order back to an ideal domesticated form of the land in the face of degeneration caused by ecological forces (Hall 2005, 213-216). For instance, a farmer might re-plant a woodlot that has burned down after a lightning strike, or foresters might “periodically ‘clean the woods’ (pulire il bosco) by thinning and trimming” (Hall 2005, 213, 216). Reparative gardening still holds the garden or domesticated land up as the ideal type against which damage is measured, but also considers the damage that humans can cause to the environment. Thus, in addition to addressing the damage caused by a lightning strike, reparative gardening would also recognize and work to ameliorate the damage caused by aggressive logging operations or overgrazing (Hall 2005, 214-215). Significantly, the aim of such reparative efforts is some kind of well-managed garden or productive farmland. Reparative naturalizing differs from reparative gardening in that the ideal is not the human managed garden, but rather untouched, primitive, wild land (wilderness). On this third approach, it is humans that are the primary sources of damage, while ecological processes actually have a vital role to play in sustaining and improving the land.

Irrespective of whether one of these models is judged to be better than the others, they together bear witness to the fact that an understanding of both the possible cause of damage and the ideal against which damage is assessed is vital to understanding whether and how an object, in this case an ecosystem, is to be restored or repaired. Understanding the possible causes of damage is significant because it can determine whether and where to look for damage. For instance, whether human agents are understood as possible causes of substantial damage to the land will determine whether to look for possible damage amidst human action on and in the land. But the actual recognition of the damage done will require a further understanding of an ideal type or exemplar against which the present case is compared. In the cases of maintenance and reparative gardening, the nature and amount of damage varied with respect to how far the present land was from the ideal of a well-manicured garden or diligently tilled and productive farmland. However, in the case of the reparative naturalizer, damage was determined by how far the land's present condition was from an untouched and wild ecosystem. Accordingly, where a reparative gardener might see the burned remains of a forest following a wildfire as a source of profound damage that warrants restoration, a reparative naturalizer might instead simply regard the burned remains as the results of and ingredients in valuable and natural ecological process that do not warrant any kind of restoration work.

Tikkun Ha-Olam

Although the term appears only a few times in the Jewish Scriptures, "tikkun" translated variously as "to repair," "to mend," "to make ready," or "to improve" has been a formative aspect of Jewish thought and practice over the past millennium. Today the phrase "tikkun ha-olam," "to repair the world," has proven to be a popular rallying cry for the practice of social justice both inside and outside of the Jewish community. But to more fully understand the dynamics of the Jewish notion of tikkun ha-olam, it is helpful to consider how the term has been used and subtly changed over the past millennium. Here I am indebted to Gilbert Rosenthal (2005), who has expertly charted the metamorphosis of the phrase "tikkun ha-olam" in Jewish thought and practice.

Classical rabbis originally used the term "tikkun ha-olam" in the sense of performing an "improvement of society" through the introduction of new legislation (takkanah) that sought to clarify or restore balance to existing Jewish laws that might otherwise have led to unfairness (Rosenthal 2005; Dorff 2007). In particular, the introduction of takkanah under the rubric of tikkun ha-olam represented an effort to clarify ambiguities that people sometimes exploited as loopholes to circumvent intended functions of Jewish law (Rosenthal 2005). For example, previously on a divorce agreement only the husband and wife's name and town of residence were required, but, out of fear that a husband might claim a different name and get the agreement thrown out, the law was altered so that a husband and wife had to provide any and all names by which they were known on the divorce agreement (Rosenthal 2005).

In the 13th century the phrase is appropriated very differently in the Kabbalah (Jewish mysticism) tradition. In the Zohar (a central text in the Jewish mystical tradition), tikkun ha-olam becomes a central concept whereby humans repair flaws in themselves, unify the divine and human realms, and restore balance to the universe by practicing Jewish rituals faithfully (Dorff 2007; Rosenthal 2005). During the 16th century, Isaac Luria substantially develops the Kabbalistic meaning of tikkun ha-olam. Luria claimed that when God created the universe, He cracked the finite vessels that are creation, displaced the sefirot (10 emanations of God), and left divine sparks lodged in the shell of sin (Dorff 2007). Humans, though, are able to repair this shattered world by faithfully practicing Jewish ritual and studying the mystical tradition of Judaism (Dorff 2007, 9-10).

In the 20th century, Emil Fackenheim uses the term tikkun ha-olam specifically with reference to the Holocaust, which he perceives as causing a profound rupture in the history and thought of the Jews, and one that must be repaired (mended). David Patterson (2008, 158) observes that following the tragedy of the Holocaust, Fackenheim's call for the work of tikkun is actually the mending of the foundational Jewish identity, faith, and traditions that make possible the traditional practice of tikkun ha-olam, that is, it is a tikkun of tikkun. Outside of Fackenheim's specific call for a distinctly Jewish recovery of the notion of tikkun in the 20th century, the phrase (tikkun ha-olam) also begins to be used widely by others inside and outside the Jewish community to refer to the work of civil rights and social justice generally in the world. Thus, as Rosenthal (2005) observes, the phrase again takes on at least some of its earliest Jewish sense, namely an improvement of society through legislation that addresses the gaps, ambiguities or loopholes in current legislation (although now the term has a decidedly more humanistic sense insofar as it is not limited strictly to Jewish law or persons).

Tikkun ha-olam is especially significant in understanding the more general idea of repair because it shows that, beyond the distinctly physical applications of repair (e.g. automobile, archive, building, etc.), there are also decidedly more abstract applications of repair, such as the spiritual condition of the self and world, justice, thought, and history. Interestingly, though, the physical pattern of repair is not entirely left behind in moving to these more abstract entities. For instance, in the Kabbalah tradition, the work of tikkun ha-olam is predicated on the understanding of a world that is shattered like broken pottery. Accordingly, the diverse spiritual practices encouraged by the Kabbalistic tradition are framed by an understanding that those actions re-assemble and re-unite a spiritually fractured world. The imagery of physical brokenness and re-assembly helps to orient and give meaning to the more abstract application of repair to the spiritual condition of the self and world.

Additionally, similar to some of Willie's automobile repairs, the more ancient use of tikkun ha-olam demonstrates the remediating impulse to not only set things in order again during a repair, but to address the issue that is causing the breakdown and to sometimes modify the object so as to ensure the more consistent and durable performance of the object's function. In the case of tikkun ha-olam, the issue is an ambiguity in the law that allowed individuals to perform actions that were not intended by the law. While this did not result in any kind of mechanical breakdown, the rabbis did perceive it as causing a kind of breakdown of the proper social order, which they then sought to correct with new legislation that clarified previous legal codes. This practice is especially interesting because, while the law is a major point of concern for the rabbis, the actual damage done is assessed by examining the community that utilizes the law. Consequently, the repair aims to bring the community back into a proper relationship with the law so that it can continue to function and develop as a good or faithful community. Repair is not only focused on discrete objects but also the web of relationships built around the use of a discrete object.

Narrative Repair

Hilde Lindemann Nelson's (2001) concept of narrative repair offers another distinctive example of repair practice. Lindemann Nelson (2001) conceptualizes a person's identity as a collection of narratives consisting in the narratives an individual tells about herself, as well as the narratives others tell about her. According to Lindemann Nelson (2001), in society there are frequently malicious master narratives, oppressive and disrespectful stories told by dominant social groups about less dominant social groups, which form the background of our understanding and subsequent treatment of one another. These masters narratives cause damage to individuals by depriving them of certain opportunities in society, and/or by infiltrating their consciousness and discouraging the capacity for self-respect. In response to the damage caused by disrespectful master narratives, which disempower individuals and groups, Lindemann Nelson (2001) offers an account of narrative repair, whereby counterstories are utilized to challenge oppressive master narratives. Counterstories work by excising or "uprooting" harmful master narratives told by a dominant group as well as the elements of those master narratives that have been integrated into an oppressed group's self narrative. These more constructive narratives also aim to empower and give respect to members of the group in order to restore or strengthen their capacity for moral agency (where moral agency is understood to hinge on both executive actions and recognition of actions as significant by others in a society). Fundamentally, counterstories try to alter perception and self-perception in order to ultimately repair individual and group identities (Lindemann Nelson 2001, 20).

Like the mystical use of the term 'tikkun ha-olam," there is a certain abstraction in talking about narrative based identities being repaired through the use of counterstories. Susan Brison (2002), who offers a similar kind of account of narrative repair that follows from her own autobiographical experience of being raped and nearly murdered, employs the metaphorical imagery of her world and memories being shattered. Lindemann Nelson (2001, xii, 150, and 155) talks about the damage done by malicious master narratives as constricting. In both cases, the underlying physical images of an object or body being shattered or constricted orient the act of repair. Brison (2002, 54, 56, and 68) talks about mastering the fragmented memories of the trauma by telling and re-telling the story so as to make the memories less intrusive and more integrated. Similarly, Lindemann Nelson describes the act of narrative repair as fundamentally an act of resistance to master narratives that otherwise constrict an individual's or group's sense of freedom (2001, 150).

Lindemann's imagery of constriction and resistance to the constricting implement (a master narrative) gives her account of repair a distinctive quality of liberation. The achievement of narrative repair is *freedom from* the malicious effects of a particular master narrative through the construction and appropriation of a particular identity constituting counterstory that challenges features of the master narrative. Narrative repair does not simply return things to the way they were prior to the damaging effects of a master narrative or how they might have been had the master narrative never existed. Instead, an individual or group's present and future identity will be shaped by the counterstory that was used to push back and throw off a particular, oppressive master narrative. As Brison (2002) observes, "It is only by remembering and narrating the past—telling our stories and listening to others'—that we can participate in an ongoing, active construction of a narrative of liberation, not one that confines us to the past, but one that forms a background from which a freely imagined—and desired—future can emerge" (99).

This liberation dynamic in narrative repair is interesting because it again emphasizes the common theme between the various repair practices so far examined, namely that repair does not offer a simple allegiance to the past, but rather it is an action that is also deeply committed to the future of some object, person(s), or relationship. When understood as liberation from some particular damage or source of harm, though, the event and achievement of repair does not simply offer an object or person a future of continued use or existence sans damage, but rather a future that is understood in light of past harms or damages that had severely impaired or jeopardized future possibilities and, yet, were overcome. The past is drawn into the future precisely through the mediating work of repair.

Moral Repair

Margaret Walker (2001, 113) has importantly observed that relationships and communities are built around the acknowledgment and maintenance of shared moral understandings, which enable life together. That is, understandings of the things that we owe to one another, what we shouldn't do to one another, who is worthy of respect, what we should expect from others, what is valuable, and so on. These moral understandings, though, depend on there being a sufficient amount of 1) trust among individuals that each person will be responsive to shared moral standards and 2) hopefulness that each person is worthy of the trust that individuals place in one another (Walker 2006, 24). As such, when moral wrongdoing occurs, such as the brutal gang rape of a young, female medical student in India while traveling with a friend on a bus through multiple police checkpoints (Burke 2013), the abilities to trust and hope become severely damaged and imperil the possibility of those moral understandings that otherwise facilitate life together in communities. Moral repair is necessary.

Walker defines moral repair as the action(s) of "restoring or creating trust and hope in a shared sense of value and responsibility" (Walker 2006, 28). Variously, this involves "placing responsibility," "acknowledging and addressing wrong, harm, affront, threat," "authoritatively instating or reinstating moral terms and standards," "replenishing or creating trust," "igniting or nourishing hope," and connecting or reconnecting [people] in adequate moral relationship." In turn, there is a repertory of familiar repair gestures that are used to perform this work: "owning up, apologizing, making amends, showing repentance, and seeking or offering forgiveness" (Walker 2006, 37). While any of these gestures might involve material implements (e.g. monetary compensation, the replacement of a lost object), the locus of repair is the damaged relationship(s) between human persons.

Significantly, while moral repair might sometimes involve punishment of a wrongdoer, it is not limited exclusively to punishment. At the end of her account, Walker aligns moral repair with the work of reparative and restorative justice, which are contrasted with retributive justice. While retributive justice focuses on appropriately punishing a wrongdoer for past harms, reparative and restorative justice acknowledge that more than punishment is often necessary in order for victims to rejoin and thrive in a community. In short, moral repair, whereby the reservoirs of trust and hope are replenished through efforts to tell the truth, apologize, make amends, and offer forgiveness, will sometimes be necessary. Thus, where retributive justice might offer a kind of repair through the effort to fix responsibility for wrongdoing and prevent future wrongdoing, it is an incomplete repair insofar as it does not completely re-instantiate the hope and trust in shared moral understandings that are necessary for the formation and maintenance of future relationships. Retributive justice is a partial repair because it does not adequately understand precisely what was damaged. By contrast, Walker's account of repair seeks to appropriately define the damage caused, not only to the victim's status as an equal member of society, but also his ability to participate in those moral understandings that even allow for the possibility of human society. This enlarged sense of the damage done by moral wrongdoing imposes additional requirements if the work of repair is to achieve a complete and successful repair.

Important for a more general understanding of repair is the way in which recognizing the range and depth of damage done is crucial to performing a successful repair. As Walker (2006, 34-35) observes, when the damage to moral understandings is not sufficiently recognized, partial or incomplete repairs can actually exacerbate the victim's sense that she cannot trust in the community's responsiveness to shared moral understandings or hope in the worthiness of others to warrant that trust. Accordingly, in her discussion of reparative justice, Walker (2010) stipulates that in order for reparative efforts to be right or good, they must be interactive, useful, fitting, and effective. In short, reparations should be a form of dialogical action between the person(s) making amends and the victim(s), such that any measures are a sufficiently specific response to the evolving and dynamic situation of the person(s) involved. This contrasts with reparations as a form of monological action in which an agent(s) offers a rigid and one-sided response to damage that is not sufficiently understood (on the distinction between dialogical and monological action, see Taylor 1995, 171-172). The dialogical possibility of repair is vital to understanding the damage done and providing a sufficient and admirable moral response.

Significantly, Walker (2006, 26-27) describes moral repair as a normative practice. That is, moral repair does not simply involve the reversion to a previous state of affairs between some person(s), but rather, it involves the efforts to ensure that morally adequate relationships obtain between persons within a community. On Walker's approach, morally adequate relationships are characterized by the well founded (rationally justified), functional capacities to trust that others will be responsive to shared moral understandings and to hope that others will continue to be worthy of the trust placed in them. Therefore, even if morally adequate relationships have never before obtained between persons in a particular place, moral repair can still occur because an understanding of what should be the case shapes the perception of damage done and subsequent repair measures necessary.

Distinguishing Between Repair Conversations

At this point, it is useful to broadly distinguish and organize these discussions of different repair practices. I suggest that automobile repair and other physical, object/artifact based repair actions (e.g. archival repair, building repair, etc.) serve as paradigm or prototypic forms of repair. While conversely, applications of repair to more abstract objects/concepts such as the human relationship with God, the narrative self, justice, and moral understandings are metaphoric cases of repair. In metaphoric cases, repair is applied to abstract objects/concepts that are being understood through reference to another domain, namely physical objects. For instance, the Kabbalistic account of tikkun ha-olam structures the phenomenon of a broken relationship between God, human beings, and the created world in terms of shattered pottery. Metaphoric cases of repair, though, should not be understood as false or deficient cases of repair, but rather as often profound extensions of the work of repair that arises from our own first personal experience of fragile bodies and objects in our daily lives. As George Lakoff and Mark Johnson (1980) have observed, our ability to think about abstract concepts (e.g. love, time, justice) is facilitated by our own embodied experience of the world and the ability to relate that experience to various concepts through the use of metaphor. Thus, metaphors are not merely poetic or rhetorical flourish but, rather, the bedrock of complex human consciousness.

Nonetheless, there are limitations associated with the metaphoric applications of repair. Spelman (2002) discusses this at some length in her review of various criticisms of the restorative justice movement. In particular, Spelman (2002, 75) notes, "There is, in short, anxiety in some quarters about whether the ready importation of the language of repair and restoration as a response to human conflict misleadingly invites us to think of democracies as things that ought to run smoothly, of groups within democracies as seamlessly joined together, of there being a social fabric the inevitable rips and tears to which should be quickly mended." Perhaps society and groups within society do not and should not function like unified and integrated objects that can be repaired. We could similarly interrogate whether the world in fact is best conceived of as like a piece of pottery (tikkun ha-olam), or whether moral understandings are like a fabric (moral repair), or whether narratives are appropriately understood as objects that can shatter or be constricted (narrative repair). The answers are complex, and generally the metaphoric application of repair or restoration to a more abstract concept will reveal or highlight as well as hide important features of the concept, and we may need to consider different metaphors at times to really understand the whole of the concept (Lakoff and Johnson 1980, 10). Nonetheless, the fact that repair and restoration language is applied to certain concepts in particular ways is revealing about how people understand the practices and products of repair and restoration, and, therefore, I aim to incorporate some of the insights (e.g. about tikkun ha-olam, narrative repair, moral repair) that I have discussed above into my more general account of repair, which I turn to now.

CHAPTER 2

A GENERAL ACCOUNT OF REPAIR

> Whenever something is replaced rather than repaired, a piece of history, something that bespeaks and sustains the continuity of life is then surrendered to the garbage heap; and an opportunity to mark and affirm the stages of life is lost.
>
> —Albert Borgmann (1984, 104)

Introduction

In this section my goal is to specify what I consider to be some of the characteristic features of repair generally, while also introducing and highlighting several questions/problems that are distinctive of repair practice. As Elizabeth Spelman (2002, 4) observed:

> …the family of repair activities shares the aim of maintaining some kind of continuity with the past in the face of breaks or ruptures to that continuity. They involve returning in some manner or other to an earlier state…Even though taking superglue to the bowl repairs it without fully restoring it to its preshattered condition, both repairer and restorer want to pick up a thread with the past.

My own understanding of repair builds on Spelman's, and I don't disagree necessarily with anything that she says about repair; however, I do think an account of repair can and should be more fully developed, specified further, and stated more systematically. On my account*, repair is the process of mending damage that presents itself as a rupture or impairment in how an individual(s) or community has used an object(s) and would continue to use an object(s).* Repair results in some object(s) that has a distinctive past history of use being made ready for reliable use again by a particular individual or community as he, she, or they have and continue to exist against a temporal horizon of past and future. This process and result, though, requires that certain questions and issues be addressed along the way, and these constitute a distinctive orientation and framework for the repairer such that repairs can ultimately be distinguished from mere replacements.

Identifying the Damage

A central problem that motivates and orients the practice of repair can be termed the "identification problem." The identification problem is the challenge of sufficiently performing the complex work of recognizing and specifying what damage has been done and accordingly what object(s) needs to be repaired. As Paul Philippot (1972, 370) asks (with regard to artistic restoration): What is the whole of the object to be restored or repaired? Is it merely an isolated object, or is it an object situated in a particular environment, such that the proper target of repair is actually the object and the immediate environment? Part of the criticism of traditional retributive justice frameworks is that they do not properly diagnose the actual damage done by various injustices and, consequently, they miss the whole of the object to be repaired. This identification of the damage done and the whole of the object to be repaired is especially significant because anything less might result in a partial repair, which not only fails to actually set things back in order and make something useful again but can actually prove insulting, disrespectful, and/or dangerous. For instance, justice proceedings that are insufficiently attentive to what went wrong amidst criminal wrongdoing can result in a cheap and useless apology, if any at all, that fails to allow for restorative forgiveness and may actually foment and exacerbate bitterness, a sense of betrayal, and social isolation, which are deeply antithetical to communities forging a life together (see Spelman 2002, 58; Walker 2006, 65; Wolterstorff 2005; Walker 2010, 43).

There are a wide variety of types of damage that might be identified and subsequently repaired: disordering, collapse, loss, decay, tearing, rupture, shattering, burning, loosening, bending, constriction, warping, buckling, shrinking, and scratches. While any of these might typically be taken as obvious forms of damage that warrant repair, it is important to observe that recognizing the damage done is more a function of an impairment in how some individual or community relates to and uses an object (damage is contextual; see Spelman 2002). For example, aging (cracks, patina, fading of colors) is often understood to improve some works of art, such as painting or architecture (see Saito 1985, 143). This means that signs of aging do not necessarily impair how the community of art collectors and connoisseurs relate to and use objects of art, but instead may sometimes enhance it, and thus would not be recognized as damage warranting repair. Alternatively, though, signs of cracks developing along the walls of a bicycle tire are a serious concern for the bicycle rider who depends on the tires remaining inflated and intact during use.

Damage might be identified in several ways, which in turn give a more or less conservative cast to the repair work. Repair is perhaps most conservative when an individual recognizes damage by reference to past states (e.g. the book was in one piece, but now it has been torn in two pieces and is unreadable; it is then recognizably damaged). But repair can also be normative such that, even if a past state of affairs has never obtained, damage is nonetheless recognized relative to normative standards about what should have been and should be now. For example, we sometimes recognize damage done by coming to see some person or thing under a different category, in which certain treatments or non-treatments do constitute harms that possibly result in serious damage. Perhaps the clearest examples of this are instances of systematic racism or sexism in societies. In these cases, certain groups of people in a society may never have been consistently respected, but upon recognizing the normative standards that should apply to these groups of persons as full persons, significant instances of abuse and damage are revealed that warrant repair, especially the kind of moral repair that Walker (2006) articulates. Even aside from cases of profound societal injustice, we can imagine a case such as when Andy comes to see that his obsessive need to constantly put Otto's notebook back on the bookcase actually causes harm to Otto who uses the notebook as an externalized form of memory, and is frequently left confused about some matter when he cannot locate his notebook. Andy had seen Otto as an individual whose cognitive powers were largely internal to his brain, and therefore did not think anything of moving Otto's notebook. However, upon realizing that Otto depends on the notebook for routine memory tasks, he also realizes the damage he has been causing and, consequently, seeks to repair the damage both by putting back in place Otto's notebook and altering his own habit of moving the notebook. Depending on how the damage appears either relative to a past state of affairs or relative to a normative set of standards about how people of a certain type should or should not be treated, repair will be more or less conservative or liberating in nature.

Bound up in this need to sufficiently identify the damage done is the need for repairers to be suitably attuned to the source or cause of damage done (e.g. natural disasters, human negligence, intentional human violence, theft, fire, collisions, forgetfulness, falling, a loose bolt, a bent or stiff chain). In his discussion of motorcycle repair, Crawford remarks, “You come up with an imagined train of causes for manifest symptoms and judge their likelihood before tearing anything down” (2009, 25). In this process of recognizing initial symptoms or signs of damage and interrogating the possible sources of that damage a dialectic process occurs. Some initial damage might be diagnosed and an object is presented for repair, but further investigation into the causes of the initial site of damage may reveal further damage, which in turn leads to a redefinition of the object of repair. In short, the actual process of repair is not a static series of linear steps but, rather, a dynamic series of feedback loops that lead to ongoing revisions in the perception of what is to be repaired and how it should be repaired.

The Materials To Be Repaired

In order to investigate the cause of damage and to begin to devise a suitable solution, repair work requires an understanding of the basic materials to be repaired; deeper understanding of those materials can result in better repairs. This understanding of basic materials is significant, because it can empower repairers to imagine the problem and solution from different vantage points. This is true for Willie, the adept auto mechanic, whose deep knowledge of the materials in automobiles and the ways in which materials function together allows him to take up the perspective of the original inventor and perform a fine grained analysis of how things are put together in sequence, what they were intended to do, and how some materials might be in conflict and causing damage. Because he understands the nature of the basic materials to be repaired and the ways in which different materials interact with each other, Willie is able to devise improvised solutions that were not present in the original design of the automobile, but do successfully repair the damage done and might even ensure better and more durable performance and use in the future.

While knowledge of the underlying materials to be repaired can be empowering, it also constrains the work of repairers that are committed to producing an effective and durable repair. Michael Forsyth (2008) in particular talks about the need for sympathetic repair, meaning an attention to the specificity of materials and methods used in the object under consideration, which, in turn will often require specific types of treatment so as not to cause further damage or result in incomplete or partial repair. This was especially well demonstrated in the discussion of archive repair in Chapter 1, in which a knowledge and understanding of the types of paper damaged is crucial to selecting an appropriate repair method that does not further damage the archival record and which can ensure a degree of future use.

The Future Use of the Object To Be Repaired

This concern about the future use of an object and its durability brings us to another major feature of the repair process, namely an understanding of the socio-temporal horizon against which the object is to be repaired—that is, the way in which an object fits into a certain socio-temporal milieu. Paul Philippot (1972, 370) asks, not only, what is the object to be repaired or restored, but also, what is the context for the object?

He meant this in the way that a physical landscape may be inseparable from the aesthetic qualities of a monument or building. However, it can be taken more broadly to indicate the repairer's efforts to ensure that an object fits within a particular community, place, and pattern of use across a temporal horizon of past and future.

Repair practice addresses an object as it exists inside of particular practices and communities. As such, a central question facing any given repairer is: What is the future of this object relative to the individual user or community of users? At times, Spelman (2002) does not seem to appreciate as clearly the way that the function of some object is a distinctive product of communities and the relationship that an individual might have with an object. For example, while it is true that Willie is focused on getting a machine to run in an efficient manner again, and, unlike a motorcycle or art restorationist, he is not concerned with whether the machine looks identical to the machine as it was originally built, this should not be taken as a sign that repair, generally, is focused exclusively on restoring the objective, mechanical functions of some object without regard for the structure or look of the object. Willie performs repairs that compliment the agricultural, North Country community that he serves and lives in. His repairs are especially oriented to getting machines functionally working again, because that is in part what his community needs when the pressing demands of the harvest and maintaining heat for the winter loom large. However, we can imagine a different community in which machines are not only used for transport and harvesting but are also used to confer status on their owners and to make statements about different kinds of relationships in the community, and, as such, the particular look of a machine is integral to how it is used. Therefore, to repair a machine in this alternative community would be concerned with both getting the machine to operate mechanically as well as to look a certain way so as to facilitate its continued use as a form of expression about one's self.

Frequently (particularly with repairs to artwork), there is a principle that one should only repair what is necessary. However, to determine what is necessary requires an understanding of how the object will be used or treated in the future by a particular individual or community (Read and Meyer 2000, 90). For example, different types of film viewing equipment handle film differently, and hence put more or less stress on different portions of the film. Therefore, the extent to which and the way in which a film stock should be repaired depends on understanding the different kinds of viewing equipment that will be used to view the film in the future (Read and Meyer 2000, 90).

Understanding the way in which the nature of repair is conditioned by the future use of an object inside of particular practices and communities helps to clarify the debate in art restoration regarding the merits of integral versus purist restoration. In short, integral restorationists argue that when some damage is done to an original piece of artwork (e.g. Michelangelo's *Pietà*), the damage should be repaired by re-installing (in one form or another) the missing material. The goal of integral restoration is to make the artwork whole again. Purist restorationists, by contrast, claim that a damaged artwork should be left as is in its damaged condition. On this approach, it is acceptable to remove some damaged fragments in order to prevent further damage to the artwork, but nothing should be added to the artwork. Instead of seeing this as a debate about which practice is a better or more authentic form of restoration or repair, it may be more useful to understand this debate in terms of a conflict between different communities and the ways in which they use an object. That is, if an object's primary use in a community of art connoisseurs is to summon a particular aesthetic pleasure, then a successful repair may involve integral restoration in which the object is made whole again so as to facilitate the specific experience of aesthetic pleasure. However, if that same object's use amidst a different community of art connoisseurs is to provide a key to understanding the particular method and intentions of a singular artist, then a successful repair might demand a purist restoration in which nothing is added that would interfere with the perception and understanding of the original artist's work.

It is clearer now that the importance of recognizing the damage done is instrumental to putting an object back in order so that it can again become useful to some individual or community. As such, during the dialectical process of diagnosis and revision of what is required, it might be revealed that there is a need to alter or change the object slightly so as to better protect its function and continued functioning, that is, to ensure the object's functional durability.

Because repair is not simply a process, but also a product, the product that is the repair should last long enough to test its effectiveness, which means that it should be able to be used as intended for some minimal period of time (Higgs [2003, 128] makes a similar point about restoration). Although good or excellent repairs will distinguish themselves by allowing for longer periods of use, a repair, to be judged even minimally successful, must allow for some use, which is to say that it must persist (be durable) for a period of time (which will vary depending on the materials involved, the environment around the object(s), and patterns of use by an individual or community). This is especially significant because it represents the greatest challenge to definitions or understandings of repair that posit a simple return to some original condition or state. Repair, as I understand it, involves the careful mediation between both history of use and a future of use. An unrelenting allegiance to the past, especially to a prior state of vulnerability/susceptibility to certain forms of repetitive damage, betrays the obligation to facilitate durable future use that is required by the act of repair.

The History of the Object To Be Repaired

But such future use is not unconnected from the past. Where the future use of an object becomes unhinged from past use, the modifying action is more adequately described as an instance of creative invention instead of repair. Invention treats a broken object as a useful collection of parts that might indicate some possibilities, but need not constrain in any way the resulting product. Instead, repair is deeply concerned with the past and therefore takes seriously the remainder of any damaged object as an important source of controlling insight into the goal and methodology of the repair. A series of important questions then face the repairer: What is left following some damage? What is the history of this object? How was the object used? What was the user's relationship to the object? These questions are important because they help to sufficiently recognize 1) the damage done and range of repairs needed, as well as 2) how the object functions in an individual or community's life and, hence, what would be necessary to allow the individual or community to use the object again in a familiar manner. This specification of familiarity is key insofar as it represents the achievement of bringing the past use of some object into continuity with future use by an individual or community. A good example of this commitment to taking the remainder seriously is offered in the example of reweaving a tapestry: "By carefully removing just enough of the damaged area to start reweaving it was possible to reproduce the original shading by closely following the color being removed" (Columbus 1973, 68). In this case, retaining a portion of the damaged tapestry allowed repairers/restorers to complete a repair/restoration that was familiar and had greater continuity with the past aesthetic qualities of the tapestry. This effort to literally or figuratively pick up the thread of the past might be expressed as a fidelity or loyalty to the past that is bound up in the act of repair.

But the loyalty expressed in repair actions is not a simple re-establishment of past states of affairs. If Walker's (2006) account of moral repair is to be taken seriously as an actual case of repair, then repair can be normative such that even if a state of affairs has never consistently obtained in the past, damage is still recognized relative to normative standards about what should have been and should be the case. In such a case, re-establishing past states of affairs would simply re-enact and perpetuate harms and injustices so as to deepen and extend already existing damage. The risk, though, is that the kind of normative repair that Walker describes actually severs connections with the past and instead is only oriented to future states of affairs. Either this is no longer repair or it represents a case in which repair is not aimed at bringing the past use of an object (or in this case, moral understanding) into continuity with future use. But this would be too quick a judgment. While moral repair may not always involve re-establishing a past state of affairs, it nonetheless maintains and preserves a deep connection to the past by incorporating the memory of the wrongs done and their causes into future moral understandings. Indeed, the success of moral repair in creating the conditions for an individual or group to trust shared moral understandings again, or for the first time, will frequently depend on the understanding that past wrongs and their causes will not be forgotten lest they occur again. Thus, normative repair work retains a kind of loyalty to the past, even if it is not a simple re-establishment of past conditions.

Putting the Object Back Into Reliable Relationship

Repair is not simply oriented around a broken object, but rather to an object that was used in a particular manner by an individual or community, an object with an ongoing history of use that has been challenged by some damage that threatens the continued use of the object. A gap opens up between the past use of an object and the possible future. There may be a literal tear or crack in the object, but there is also a figurative tear or a crack in the socio-temporal milieu in which the object is used. It is not simply the object that is broken, but the ability of an individual or community to relate to an object in an ongoing, similar, or same manner. Without being committed exclusively to the past or the future of an object, the repair action pares the edges of the tear between past and future use of an object and sets about to mend the rupture. Sometimes simply setting the object back in order will be enough, but at other times more will need to be done to complete the repair. For example, when I take my car into the mechanic's shop to be repaired, I looked forward to the conversation with the mechanic afterwards or during the repair in which he explains to me what has gone wrong, how he fixed the problem, and what I can expect from the car in the future. This conversation is important to me, because it helps to mend the rupture between my past use of the car and my hoped for ongoing use of the car. In this conversation, the mechanic indirectly or directly acknowledges how I used the car in the past and indicates his efforts to achieve the same or similar performance for the future. If this conversation did not take place and, instead, I was only presented with a now functional vehicle without any explanation of what was wrong and what had been done to fix the problem, the repair would be partial, I would not have been set back into a reliable relationship with the car in which past and future use were of one piece. In fact, I might even wonder if I had been given back my car or simply a very close replacement.

The Humility in Repair

A spectrum begins to appear, in which repairs can be done better or worse with respect to how well the repair work 1) sets an object back in working order, 2) acknowledges the past and future use of an object by an individual or community, and 3) strives to integrate any work directly on the object into relationship with a particular individual or community. While technical skills along with good communication skills will enable repairers to perform better repairs along this spectrum, an additional commitment to humility amidst the act of repair is necessary (see Spelman 2002; Mumford 1952). As Crawford observes, "A washing machine, for example, surely exists to serve our needs, but in contending with one that is broken, you have to ask what *it* needs. At such a moment, technology is no longer a means by which our mastery of the world is extended, but an affront to our usual self-absorption" (2009, 16). Not only does the repair person ask what the object needs in order to be repaired, but he or she should also recognize that what the object needs is bound up in how an individual or community uses the object, and thus the repair person asks what the individual or community needs. Good repairs require a posture of humility in the repair person, whereby she does not project her own desires and understandings on the object under consideration but, rather, allows her repair work to be guided by the needs and desires of those persons in ongoing relationship with the object. In this manner, repair work, especially the dialectical process of coming to understand the damage done to some object as it exists in a particular socio-temporal milieu, functions in a way similar to Iris Murdoch's (1971) account of the moral significance of great art. According to Murdoch (1971), great artwork can draw viewers out of a relentlessly anxious and self-absorbed state of existence and into a deeper consideration of the world that imposes boundaries on our own egos and, thereby, begins to facilitate a more humble relationship with the world and others.

Where the humility of a repairer is first manifest in an inquiry about the needs of the object and the individual/community in relationship to the object, it persists and is brought to fulfillment in the acknowledgement of a certain fallibility about any repairs completed. That is, damage can be misdiagnosed, solutions for the damage might not hold, the materials used could be inferior to other materials available or that will become available in the future. In all these cases and more, the repairperson acknowledges that the repair he completed was made at a particular moment in history, in which certain tools and materials were available and with limited knowledge that might either be wrong or incomplete now or in the future. This understanding of fallibility amidst repair is then acknowledged by the effort to include some indication of how and where a repair occurred either on the object or in a record of some kind that can be related to the object so as to allow future repairers to correct or improve any deficiencies in the repair that might be revealed by new technologies, repair methods, or understanding about the particular use of the object relative to an individual or community (see Spelman 2002, 16; Sagoff 1978; Ellis 1951; Bendall 2013). In this manner, while the humility of the repairperson is self-effacing in directing the inquiry about needs to the object under consideration and in relation to an individual or community that uses that object, it does not amount to an invisibility of the repairperson and her work. Instead, the repairperson preserves some mark or record of the completed repair for those future repair efforts that objects will inevitably need. Thus, like Lindemann Nelson's (2001) notion of the counter-story that is developed to challenge master narratives and bring about varying degrees of narrative repair in an individual's sense of self, the repair work itself often persists in some form and becomes integrated with the ongoing use of an object, relationship, or identity.

The mark of a repair may serve an important role in conditioning a more respectful treatment and use of an object or relationship. For example, a broken piece of pottery that has been obviously, but skillfully glued back together can serve as a persistent reminder of the fragility of the pottery, which then shapes and guides the careful handling of the pottery. This need not be a failure of the repair work—that is, the pot is not now more fragile because of the repair work (though it might be), but, instead, the mark of a previous repair reveals the always present but previously hidden quality of being especially fragile. Repairs can tutor our understandings of materials and the ways in which we use them, and thus, while repairs might put an object back into hand to use the object in similar or identical ways to past patterns of use, it never returns or resets us to a previous past state entirely. Instead, we continue to use some object on the basis of having experienced the repair and continue to remember the repair in some fashion through visible reminders on the object or records about the repair work done.

Stepping back now we can see that it is precisely against the lived socio-temporal horizon that the particularity of damage to be repaired comes into its fullest relief. That is, the dialectic that commenced earlier between the questions—What is the object of repair? What is the cause of the damage?—is furthered now by questions that situate the object within its socio-temporal horizon—What is the past of this object? What is the future of this object? What is necessary to ensure ongoing use? Damage, while recognized at least tentatively prior to repair, is understood more fully as the process of repair unfolds, and similarly, the solution to some problem (damage), while initially hypothesized, will continue to be refined, filled out, and improved upon as the process of repair progresses.

The Possibility of Repair

Before going further, it is worth asking, is repair even possible (which is distinct from questions about whether it is prudent or wise to perform a repair). A skeptic might argue that time flows in only one direction, the past can never be recovered, and it is naïve at best, arrogant at worst to believe that a return to some original state is possible (even aside from issues of assessing what that original state might have been).

However, as I have discussed above, repair is not about an actual return to a past condition; rather, it is a mending of the rupture in the structure and/or function of some object such that it properly fits once again between past patterns of use and intended or hoped for future use. Repair aims to make an object useful again where ongoing use is conditioned by a distinctive past. Repair work must be sensitive to the historical use of an object, but it is ultimately committed to providing an object that can be reliably used again following some damage. That is, the emulation of a past state of affairs is not the ultimate goal of repair, but rather the understanding of past states of affairs is instrumental to present and future use. This effort to re-establish continuity between a history of use and possible future use through an object that exists in relationship to an individual or community that has used and will use the object is certainly conceptually possible. Although some accounts of "restoration" avoid talk of actually returning to an original condition (e.g. Eric Higgs [2003] account of focal ecological restoration), some do not (e.g. 19th century building restorationists), and this is problematic given the skeptic's proper worry about the limits imposed by the irreversibility of time. This is at least one reason why I utilize the term "repair" instead of "restoration" in my own account of cognitive-agentic repair.

While conceptually possible, the practical possibility of repair in any given situation will be importantly subjective depending on the repair person's understanding of the basic materials involved, the tools available, skills in using those tools, understanding of the relationship between parts and function, sensitivity to the types of damage possible in any given material and an interest in and understanding of the causes of that damage. However, even assuming an adept repairperson, some objects will resist and possibly thwart the repair efforts owing to: [1]

- Sealed design in which affordances for disassembly were never intended or created by the original manufacturing process
- The arrangement of parts so that even the attempt to disassemble an object will cause further damage to the object
- Proprietary knowledge about underlying computer programming
- Non-standard or obscure part sizes and fastener types that require custom or extinct tool sets, or weak fasteners that do not stand up to repeat use
- Threat of voiding the warranty
- Incomplete or absent service documentation (error codes, wiring diagrams, etc.)

Therefore, while repair should be understood as conceptually possible, it may or may not be technically possible depending on the knowledge, tools, and skillset of the repairperson and/or the nature and design of the object(s) itself. Of course, though an object(s) might be assessed to be technically repairable given sufficient time and resources, the reality of limited time and resources, will mean that many things that may be technically repairable, simply are not repairable in a world in which the demands for food, water, friendship, caring for family, paying bills, and so on will ensure that the range of repairable objects is in fact considerably smaller than what is judged to be technically repairable given enough time and resources.

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[1] These insights were gleaned from the "Design for Product Lifetime Infographic," *Makeshift.org, July 3, 2012,* http://mkshft.org/2012/07/design-for-your-product-lifetime/; and "Self-Repair Manifesto," iFixit.org, accessed on February 21, 2014, http://www.ifixit.com/Manifesto/.

Goals of Repair

On my approach, the goal of repair is to make some object that has a distinctive past history of use ready for reliable use again by a particular individual or community. This will entail that, assuming the object is judged to be reparable, there should be continuity of the object brought in for repair with the repaired object that is ultimately returned to some individual or community. This will not entail strict identity, insofar as parts may need to be swapped, or even in some cases a novel part fashioned, so as to avoid repetitive damage and ensure reliable functioning; but, even if some margin of change to the object is permitted, it is not radical change (which would be closer to invention instead of repair). This commitment to object continuity owes, in part, to the requisite epistemic humility of any repairer, which should deny the impulse to create a new object for some perceived function. The repairer operates from a position of asking what *this* object and the person who uses the object needs in order to be repaired. To create a new object entirely dispenses with this line of questioning.

Given the goal of repair, it also follows that a good or successful repair must hold for an accepted amount of time depending on particular use patterns and conditions. This aspect of durability in any given repair is important because it is only insofar as a repair persists for some amount of time that it can even be judged to be a successful repair or not (Higgs 2003, 128). Significantly, though, because repair not only aims to put an object back in order but also to put it back into a relationship of reliable use with an individual or in a community, the repair should hold not only long enough for the repair person to judge its acceptability but also long enough for the individual or community that has used and will use the object. Nonetheless, if the individual or community fails to use the object before time ages and breaks down the object then that is not a failure of the repairperson.

In discussing the goal of repair, it is also important to directly address the issue of whether repair is simply concerned with the function of an object while restoration is concerned with the structure and look of an object. For example, in a footnote, Spelman (2008, 246) says, “As noted earlier, "repair" and "restore" are not synonymous. While the restoration of a building, for example, to an earlier stage of its history involves repair, repairing a building so that it can carry out its basic functions does not involve restoration to an earlier structural or aesthetic state.” Here we begin to see a dichotomy open up in which repair is separated from concerns about the prior structure or appearance of an object and instead is directed to the function of an object, whereas restoration emulates or re-establishes a prior structure or appearance. Godlovitch (1989, 40) says, “Repair is functional restoration, while rejuvenation is the restoration of appearance.” The supposed divide is thus made explicit; repair is aimed at simply restoring function in contrast to appearance.

However, placing too strong of an emphasis on the functional aspect of repair is problematic. If repair is focused strictly on function, then relatively high-level functions could be recognized and entirely new objects offered. For example, if an individual brings her car to an auto-mechanic for repair, he might recognize that she uses the car as a means of transportation, which she cannot do now, and, in turn, he provides her with a brand new car and calls it a sufficient “repair.” Apart from whether this is good business or whether the customer would even argue with receiving a new car, it seems absurd to call it a repair. However, on a strictly functional approach to repair, it would be considered a repair because the high level function (a means of transportation) was addressed by offering a new car that would allow the customer to transport herself.

As I have argued above, the humility of the repairperson should entail a line of questioning about what the object brought in for repair needs in order to be reliably used again by a particular individual or community. However, that question cannot be asked and answered if an entirely new object is put in its place. If an object, as it is used by a particular individual or community, is recognized as needing certain alterations, additions, or subtractions then those are things that are owed to the object under consideration. But those needs simply go unmet if an entirely new object is offered in its place.

At this point, though, a skeptic might argue that typically when repairs are performed, we tolerate a certain amount of alteration or substitution to some of the parts internal to the object under consideration (e.g. the broken drive belt in an automobile might be replaced entirely). What if, instead of considering the object of repair as simply the physical artifact, we instead treated the artifact and the person using the artifact as the actual or whole object of repair. Wouldn’t it then follow that just as we tolerate some alterations and substitutions internal to the car being repaired, we might, given this enlarged frame of repair, allow certain substitutions and alterations internal to the person and artifact imagined as a unit? In which case, given a person and car as the object of repair, it might be acceptable to offer a brand new car as a sufficient repair, just as we might otherwise treat a new engine within the car as a sufficient repair.

The problem with this approach is that artifacts (at least as we know them now) do not have any autonomous reasoning capabilities by which they can choose to associate and form relationships with other artifacts. Conversely, most human beings do have varying degrees of autonomous reasoning capabilities by which they can choose to use one artifact or another in carrying out different projects. Therefore, even if the person + artifact is the relevant object of repair (and in Chapters 3 and 4, I will argue that it is), it is significant that an individual has chosen a particular object to carry out a project, and that moreover, by choosing that particular object and performing certain tasks repeatedly, he becomes increasingly skilled in accomplishing his project through the use of *that* particular object. Where a repairperson treats the artifact in the person + artifact relationship as fungible, he is disregarding the important fact that this person chose to use *that* particular object. The value of *that* choice is underscored by the fact that the individual is now seeking to have *that* chosen object repaired. If one object could serve just as well as another then there are countless stores and retail sales agents who would be happy to facilitate such a replacement, but that would be a different endeavor than seeking out repair services. The humility that is called for in repair demands a deeper respect for the choices of autonomous individuals in choosing to use particular objects, and thereby, while substitutions and alterations might be made internal to an artifact, the same degree of changes cannot be assumed in the relationship of person and artifact.

Another problem in treating repair as strictly functional and restoration as concerned with structure and appearance is that such a strong dichotomy between function and structure/appearance simply misses the deeper truth that function is bound up with the structure/appearance of an object. Of course there is a trivial sense in which an object cannot function properly if certain structural elements are not in place, but there is a more significant sense as well. Merleau-Ponty (|1948| 2004, 48-49) observes,

> The things of the world are not simply neutral *objects* which stand before us for our contemplation. Each one of them symbolizes or recalls a particular way of behaving, provoking in us reactions which are either favourable or unfavourable. This is why people's tastes, character, and the attitude they adopt to the world and to particular things can be deciphered from the objects with which they choose to surround themselves, their preferences for certain colours or the places where they like to go for walks… Our relationship with things is not a distant one: each speaks to our body and to the way we live. They are clothed in human characteristics (whether docile, soft, hostile or resistant) and conversely they dwell within us as emblems of forms of life we either love or hate.

How we use particular objects is conditioned by how they appear to us, which is often experienced through the affective reactions that the objects provoke in our bodies such that we are attracted to some objects, repulsed by others, and clumsy in our use of still others. Whether we use and how we use an object is bound up in how our bodies interface with the look and feel of an object. Objects are not simply used, but rather they are used in familiar manners. Familiarity is not simply an abstract, cognitive judgment about quantity of use, but also a felt, qualitative experience of the object against or around my body. Therefore, to repair the function of some object, and, especially, to repair the function of an object as it is used by a particular individual or community, will also require some attention to the prior look and feel of the object in order to set the object back into patterns of reliable use within a socio-temporal milieu.

An important qualification needs to be made here, though. There are some material things that I use to carry out some functions without ever experiencing the appearance of the thing. For example, I use my brain to remember various things that have occurred in my life. However, the look of my brain plays no role in how I use my brain to carry out certain memory functions (though, the feeling of certain conscious states will certainly affect how I remember and whether I even can remember, for example the sluggishness associated with drowsiness, headaches, etc.). Nonetheless, there is sometimes damage to the brain that warrants repair. It may be acceptable in such cases to repair parts of the brain with sophisticated, synthetic neural implants of one kind or another, for example “brain pacemakers” that are used in the treatment of epilepsy and depression. These kinds of devices would undoubtedly alter the look of the brain, but such a modification does not necessarily dramatically alter how an individual uses the functions of the brain. Thus, in some circumstances, repair can be more concerned with function and depart more considerably from the appearance of an object or thing. It is significant here, though, that the brain is a biological given that the individual did not have a choice about, and thus seems to be a special case of repair. Whereas, when an individual has deliberately chosen some particular object for use, the repair should be attuned to the look and feel of the object in addition to function.

Another interesting case of functional repair is found in the situation of an individual with an amputated limb(s) who resolves to use a prosthetic limb(s). It seems that in most cases the prosthetic limb is made to look and feel as close to how a biological limb would look and feel, thus fitting the standard case of repair that I have outlined above. However, there are some cases such as athletes with amputated limbs who use prosthetic limbs that look dramatically different than standard biological limbs (such as the Flex Foot Cheetah Blade legs, consisting of a minimal, curved piece of high performance carbon). Interestingly, there has been a major conversation about whether these types of highly specific prosthetic limbs actually constitute an enhancement of an athlete's capabilities that gives them an unfair advantage over other athletes with biological limbs. Thus, in some cases, these limbs may not actually be properly a repair, but instead an enhancement (though this distinction is a difficult one to maintain). But, even if they are considered a repair, it is important to observe that these highly stylized prosthetic limbs are often meant for very specific functions, such as running a 100-meter sprinting event on an artificial track. In such cases, the company that designs the prosthetic leg is not offering a prosthetic repair patterned on the biological leg generally, but rather specifically for the repair of the running-leg-in-motion. That is, the pattern of the repair is not simply a biological leg, but rather a leg that performs particular types of motions and to particular effect in order to accomplish the act of running. In short, what a leg looks and feels like running may be very different from what a leg looks and feels like walking or standing, and therefore a prosthetic leg meant for running may appropriately look very different than a biological leg not in motion. Thus, even here, the repair offered by a prosthetic running limb is still attentive to how a leg has or would look and feel, but it is especially attentive to the look and feel of the leg inside of a highly specific pattern of use (namely running).

Are we then at an impasse in distinguishing between restoration and repair? Is one term as good as the other? Certainly there are those that use the term restoration that do intend an exact re-creation of some past object(s), and I would want to use my account of repair to distinguish myself from those accounts that are too fixated on re-establishing past states of affairs. However, there are some accounts of restoration (such as Eric Higgs [2003] account of ecological, focal restoration) that are attentive to the present and future of some damaged object within a particular social horizon, and my account of repair then is similar. It seems that the best maneuver at this point might be a Wittgensteinian one in which we acknowledge that our concepts and our language are often held captive by particular pictures that are conditioned by the everyday practice of and facility with certain words in specific contexts (see Wittgenstein 2009, 53).

Repair is a term that is more at home in the communities of auto mechanics and seamstresses, whereas restoration seems to be more at home in the communities of artwork conservationists and ecologists.[2] Of course there is not a strict separation here, some auto mechanics do restore old automobiles. Nonetheless, in these tentative and loose associations, we might discern a faint pattern. Repair tends to be associated with putting back into use the *everyday objects of living persons at this present time*. Restoration (especially, art restoration and ancient building restoration) tends to be

[2] I think that ecologists would be better served by adopting the terminology of repair instead of restoration. This owes in part to the difficulties of treating the dynamic processes of nature like a static artwork. Instead, an account of repair like the one I have offered would allow ecologists to strike a balance between fidelity to the past and promoting future, respectful use of natural habitats. I intend to develop this argument in an article following from this dissertation.

associated with preserving *historical and singular objects whose original creators are now dead*. The inability to simply create another *Pietà* by Michelangelo means that art restorationists are especially concerned with preserving the one and only instance that we have of Michelangelo's *Pietà*. Of course, counterexamples are bound to be offered here which challenge this distinction. This is a soft distinction that simply observes some loose family resemblances in the ways that different communities use a particular term.

An Illustrative Contrast

Lurking in the background of much of my analysis up this point has been an important distinction between the practice of repair and replacement. Repair of some object or relationship amongst objects and person(s) is distinct from the move to simply replace broken objects/relationships in their entirety, although the two might be conflated if repair is improperly understood as merely fixing the problem of lost functionality. That is, if repair is treated as merely a product, and especially a product that resumes previously lost functionality, then repair and replacement can be equivocated. However, understood as a process involving various processes of questioning, a dialectical understanding of the damage done, an attitude of humility, and so on, then major differences open up.

This distinction was initially suggested in the above discussion of automobile repair, in which Doug Harper, John Jerome, and Mathew Crawford all sought to distinguish authentic, robust, or multidimensional automobile repair from what might be loosely termed rationalized repair. I take rationalized repair to amount to a regime of *mere* replacement in contrast to multi-dimensional repair. Multi-dimensional or robust repair work is characterized by a commitment to taking seriously, maintaining, and working with the remainder of some object, as much as is possible, following some damage. But a strategy of mere replacement avoids taking seriously the remainder by skipping over a sufficiently deep study of the damage. There is little or no effort to sort out what is actually damaged and what is still reliably intact; the proper diagnosis of damage and development of fitting solutions is foregone to instead simply replace the entire object or large portions of an object. As Crawford remarks, “What ordinary people once made, they buy; and what people once fixed for themselves, they replace entirely or hire an expert to repair, whose expert fix often involves replacing an entire system because some minute component has failed” (2009, 2).

Sometimes repairs do involve the replacement of parts, but when the repair person does need to replace a part, he or she does not simply drop a new item into place to fill some gap or tear, but goes further in striving to mesh the old with the new. Jerome (1977, 35) captures this process especially well in his description of remanufacturing an old truck engine:

> A remanufactured engine is very likely better than a new engine. Sears, for example…dismantles the engine completely, boils out the block in various cleaning baths, inspects the parts electromagnetically for cracks and flaws, regrinds, recenters, realigns, balances, and hones everything that is still usable, and replaces everything else with new parts. New-car assembly lines operate on the assumption that since all the parts are new, the tolerances are close enough. The remanufacturer, on the other hand, must fit carefully, old to new. It is a different working stance. The assembler of new engines takes parts out of a bin and puts them into the block in front of him, just like the boss told him to. The remanufacturer necessarily exercises choice, selects carefully, measures, aligns, fits.

The remanufacturer in this case, who I treat as a kind of repairperson, does not simply reassemble a damaged engine, but rather strives to carefully mesh old parts with new parts by attending to the deep particularity of the engine under consideration. On this approach, parts are not merely dropped into place, but rather they are *fitted* into places and spaces that are already worn and shaped by the other surrounding parts, just as a repaired object is eventually fitted back into a place of ongoing use by a particular individual or community. Mere replacement, by contrast, is a basic process of re-assembly according to provided instructions and is not especially attentive to the process of fitting a new part into and alongside older material. As Jerome (1977) remarks about auto-shop stores that sell parts assemblies, “They have the new-car-dealership mentality: anyone who tries to *fix* anything is an unpatriotic drag on the economy. Replace, don’t fix. Perform surgery at the largest possible assembly point, and transplant. They sell units, not parts” (60).

The distinction between repair and replacement can be further clarified by reference to Michel de Certeau’s (1984) distinction between place and space as well as Maurice Merleau-Ponty’s (|1945| 2012) distinction between geometrical space and lived space. For Merleau-Ponty, geometrical space is the designation of objects in positions without reference to the body (alocentric space), whereas lived spaces always take shape relative to the living body (egocentric spaces). Merleau-Ponty remarks “For me, my apartment is not a series of strongly connected images. It only remains around me as my familiar domain if I still hold ‘in my hands’ or ‘in my legs’ its principal distances and directions, and only if a multitude of intentional threads run out toward it from my body” (2012, 131). Lived spaces are felt and maintained in and by the intelligent body that serves as the vital center around which things appear and are related to. According to de Certeau (1984, 117) a place is defined as a static, stable configuration of objects whereas a space is a practiced place consisting in vectors of direction, velocities, and time variables between and amongst objects. Thus, geometrical space might be compared to de Certeau's account of a place, whereas lived space is compared to de Certeau's account of space as a practiced place. Re-*place*ment then can be defined as the effort to put a part or object back into a static and stable configuration (a place or geometrical space). Repair, by contrast, acknowledges the static configuration of parts and objects, but also observes the ways in which those parts and objects take on various vectors and velocities relative to one another in particular patterns of use by a person or community. Repair then aims to fit the object back into the space of a lived milieu. This lived milieu has two dimensions: 1) within the object itself (between constitutive material parts), and 2) the object situated within a larger socio-temporal horizon of use by an individual or community.

Other Useful Distinctions

Several other important distinctions can be noted, which serve to fill out my account of repair. Repair is distinct from a trio of closely related activities, namely maintenance, conservation, and preservation.[3] The significant difference here is that the precise work of repair follows from actual damage done to some object(s), whereas maintenance, preservation, and conservation address a structurally intact, but unstable object. Thus, an archival document may be chemically unstable and in need of some

[3] I do not mean to elide the subtle differences between these terms, but rather only to note certain general commonalities between them that can be distinguished in contrast to repair.

chemical treatment in order to make it sound and prevent damage from occurring to the document, in which case the document is conserved (Baynes-Cope 1994, 23). If the archival document is already torn or disintegrating in part, then repair will be necessary. Relatedly, the work of preservation and maintenance in the home aims to keep objects alive with significance, wholeness, and usefulness by repetitively dusting, repositioning, cleaning, and even narrating the histories those objects as they exist within a particular space and set of relationships to particular individuals (Young 1997, 153). Similarly, Ruskin in his discussion of preserving ancient buildings says, "Take proper care of your monuments, and you will not need to restore them. A few sheets of lead put in time upon the roof, a few dead leaves and sticks swept in time out of a water-course, will save both walls and roof from ruin. Watch an old building with anxious care; guard it as best you may and at any cost, from every influence of dilapidation" (1989, 196). The common theme that becomes clear in accounts of maintenance, preservation, and conservation is that they are pre-emptive activities that occur prior to damage, but mindful of the possibility of particular types of damage, and, thereby, aim to prevent some types of damage from occurring or, at least, delay or slow the occurrence of recognizable damage.

At this point, though, someone might claim that repairs are often understood as an aspect of the work of maintenance or preservation. However, for the sake of clarity and precision here, while it might be true that to maintain or preserve some objects in perpetuity will occasionally require repairs, it is more accurate to specify that repairs allow the work of maintenance and preservation *to resume* following some damage to the structure and/or function of an object, which had interrupted the work of maintenance, preservation, or conservation. Of course, there are instances in which the work of preservation continues even when the object is damaged, such as when individuals or groups endeavor to preserve the ruins of a medieval castle. However, in such a case, the object of preservation is no longer the complete or whole castle itself but, rather, the castle in a particular state of ruin.

Hacking is similar to maintenance, preservation, and conservation in that it is not a response to the occurrence of damage. Instead, hacking is concerned with overcoming, improving, or going beyond the current functions and limitations of a technology.[4] The term "hacking" itself has developed in parallel with the computing/programming revolution of the past 20th and 21st centuries. The Massachusetts Institute of Technology Tech Model Railroad Club, which began in 1946, claims to be amongst the first adopters of the term "hacking."[5] According to Andy Miller a long time member of the club, he says about the term "hack," "When one did something ingenious and clever and unthought of with some technology, it was known as a good hack" (Saini 2012). Later, in the popular press, the term took on more dubious tones in referring to individuals (hackers) who broke into private, computer systems to steal some form of data (e.g. bank account numbers). Hacking became a way of describing the often-sophisticated

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[4] There are deep affinities between the use of the terms "hacking" and "enhancement." In future work, I would like to consider whether in fact these terms are synonymous or whether there are slight differences which can prove useful in clarifying each term. In particular, I am thinking about the fact that "hacking" is typically applied to artifacts, whereas "enhancement" has been frequently used in discussions of modifications to the human body. Accordingly how might adopting the language of "hacking the human body" help or hinder discussions about the ethics of modifying human bodies through technological prostheses and genetic engineering?

[5] "Hackers" *Tech Model Railroad Club of MIT* website, accessed on May 1, 2014, http://tmrc.mit.edu/hackers-ref.html.

programming knowledge and skills necessary to break through digital security systems and access otherwise protected files. More recently, though, there has been a return to the earlier sense of the term hacking as “any clever trick that gives a product functions other than those specifically intended by its creator” (McCracken 2007). No longer confined strictly to computer security systems, the term is applied to virtually any object that can be modified in some fashion to give the user(s) new functions. As one technology magazine reports,

> You can easily hack all kinds of hardware gadgets and software yourself to add features, improve performance, and lord it over your less techie friends…Want a useful alternative OS for your iPod that offers sound enhancement and more flexible playback? No problem- we have instructions that let you do it in minutes. Tired of the commercials you see when watching shows on your Media Center PC? Poof! Kiss them goodbye. Even your car is fertile territory for a few hacks. (Rupley 2006)

Unlike repair, the object to be hacked need not be damaged in any fashion. Thus, hacking does not necessarily involve the perception of damage done, but rather observes latent possibilities in collections of parts and software. In this fashion, hacking appears to be closer to the creative action of invention. Accordingly, where hacking might result in considerable departures in the form and function of an object, repair is more conservative in its effort to ensure continuity between past and ongoing, future use.[6]

The tagline for a company, called Sugru, that sells a flexible putty that can be

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[6] In future work, I would like to more closely evaluate the extent to which Hilde Lindemann’s (2001) account of narrative repair is usefully understood as entirely one of repair, or whether some aspects of her account of repair might be more meaningfully analyzed in terms of narrative hacking. I do think that narrative repair is a response to damage caused by oppressive master narratives, and thereby does count as a kind of repair. However, it seems that in the always ongoing work of personal identity construction through narrative there is also a place for narrative hacking in which certain limitations of group based narratives are overcome or modified in some fashion, but which does not rise to the level of developing a full counterstory to challenge a sinister master narrative.

used to modify objects in nearly endless fashion uses the tagline “Hack things better” and reports on their website (http://www.sugru.com) the user testimony, “I don’t want to buy new stuff all the time. I want to hack the stuff I already have so it works better for me.” Not only does hacking have the meaning of aiming to overcome certain limitations in the original technology, but it also has the meaning of personalizing or customizing an object so that it better fits the way in which a given individual wants to use the object. This additional meaning of the term hacking is interesting because it is closely related to the way in which repair is not only aimed at putting some object back into mechanical order but also fitting it back into relationship with the individual user or community. Both this version of the term “hacking” and repair practice share this concern for the particularity of individuals and groups, and the resulting need to ensure a good fit between object and person(s). Though again, repair is carried out within the context of damage done, and accordingly the work of fitting the object into lived relationship with some individual will be shaped by the particularity of the damage done in ways that hacking might not be.

Rehabilitation is another word that has very close meanings to repair and restoration. Indeed, in several of its definitions for “rehabilitate,” the OED (2009) shows that some uses of the term “rehabilitate” are equivocated with the work of repair and/or restoration, especially in cases where the object of rehabilitation is a material artifact (e.g. a car or building). However, we can also talk about rehabilitating living things (human beings) or dynamic systems composed of living and non-living things (ecosystems). In the case of rehabilitating a living thing, rehabilitation distinguishes itself as a process of nurturing, encouraging, and facilitating the natural/biological development of certain latent capabilities and processes. For example, Holmes Rolston (2012), in discussing ecological restoration, says, “In nature we restore by rehabilitating. One does not rehabilitate paintings. But nature may, once we put the parts back in place, heal itself” (184). Rolston’s point here is that with enough biological resources in place, ecosystems can carry out the work of healing or repairing themselves—that is, ecosystems have a certain amount of resiliency that enables them to naturally recover from certain forms of damage. Of course if the damage is extensive enough to wipe out key biological resources, then this capacity for self-healing or self-repair is lost, and then some direct repair efforts (e.g. surgery) by an individual or group of people may be needed (e.g. a torn heart valve is mended with needle and suture thread; toxic waste is removed from a water source). Rehabilitation then follows after any necessary direct repair interventions and involves supplying certain important resources or otherwise creating safe spaces for resources and capabilities to gradually develop so as to nurture the general, living capacity for resiliency to various forms of damage (blood clotting near a wound) and maintenance to prevent damage from occurring (automatic filtration and removal of waste products from the body).

Reasons For Repair

In thinking about why we might engage in repair, arguments are typically directed either at reasons to repair material artifacts (e.g. cars, computers, or books) or reasons to repair human beings and interpersonal relationships. The typical reasons to repair artifacts are by now relatively familiar. There is 1) the environmental argument, and 2) the economic argument.

The Environmental Argument: The human species is rapidly using up and polluting natural resources and, in the process, is putting the future of humans and non-human species in jeopardy. If the human species as well as other non-human species are to survive, then we must reduce the rate at which we utilize and pollute natural resources. An important way in which we can reduce the rate at which we consume and pollute natural resources is to repair those artifacts that we already have, thereby diminishing demand for new goods and keeping existing goods out of landfills.

The Economic Argument: Limited economic resources should be conserved so as to facilitate and/or maximize spending on those goods that are most desired or beneficial. When repair offers a cheaper alternative than buying a new object entirely, then repair offers the more rational economic strategy.

Alternately, when repairing persons or interpersonal relationships, the reasons are different. For instance, given damage to the human body, there is, in most circumstances, a recognized responsibility to diminish pain and suffering, and to attempt to repair the human body when resources and knowledge are available (e.g. in hospitals amongst health care professionals). This kind of repair may admit of several moral justifications, but a central and fundamental feature of such accounts will typically be the recognized singularity of a human life and the acknowledged, general good of human existence.

When the relationships between persons are damaged by lies, abuse, or other moral wrongdoings, the abilities to trust in shared moral understandings and hope that others are worthy of the trust placed in their capacity to maintain moral understandings are compromised (Walker 2006). This ability to trust and hope in shared moral understandings is essential to any form of meaningful and respectful social life together. Therefore, the repair of relationships and moral understandings amongst and between individuals and communities is vital for the ongoing, respectful social life that we need and desire as human beings.

The arguments above signal separate attention to artifacts, the human body, and human relationships as the subject of repair, but what about the relationship between embodied persons and artifacts? Do we have a specific and clear account of repair and its accompanying reasons that is adequately attentive to the profound ways in which human bodies and artifacts are bound up together and, consequently, the distinctive ways in which damage will appear and be understood against such a backdrop of the interconnected extensions of the human subject? Yes and no. Certainly, in talking about the repair of interpersonal relationships and moral understandings held in common, this will sometimes involve consideration of damaged material property (see Walker 2010). For example, theft undoubtedly damages interpersonal relationships and moral understandings about how persons should be treated. Accordingly, when some property is stolen, the perpetrator, if caught, may be required to replace or return the property or otherwise, even if no perpetrator is caught, another individual, group, or business may endeavor to replace the property so as to repair moral understandings about the respectful treatment of all persons. But, as I will venture in Chapters 3 and 4, our understandings of why and how we return or repair the damaged property can vary considerably depending on the picture of human persons we employ. Our as yet insufficient attention to the cognitive significance, in addition to the affective and pragmatic significance, of material artifacts for human persons has meant that our understanding of the damage done in some circumstances (such as theft) has been imprecise, and, therefore, our moral responses have not been as specific/fitting as they can and should be. In the next two chapters, I argue that in addition to something like Margaret Walker's very capable account of moral repair at a general, interpersonal level, we need a more specific account of repair (what I term "cognitive-agentic repair") that penetrates more deeply into the damage peculiar to human thinking subjects as their thought processes are sometimes extended or embedded in and amongst brain, body, and world.

CHAPTER 3

TWO CONCEPTIONS OF PERSONS

> These two related sets of facts, those concerning our vulnerabilities and afflictions and those concerning the extent of our dependence on particular others are so evidently of singular importance that it might seem that no account of the human condition whose authors hoped to achieve credibility could avoid giving them a central place. Yet the history of Western moral philosophy suggests otherwise. From Plato to Moore and since there are usually, with some rare exceptions, only passing references to human vulnerability and affliction and to connections between them and our dependence on others.
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> —Alasdair MacIntyre (1999*,* 1)

Introduction

It is by now a familiar, though still important, insight that how we imagine and perceive other human beings has an essential bearing on how we respect and act towards them.[1] In this chapter, I consider two important and rival ways of imagining and perceiving human beings: 1) first as dependent and situated thinking creatures, and 2) secondly, as *hyper*-individualistic and brainbound thinking creatures.[2] A number of philosophical accounts have assumed and privileged a picture of human persons as hyper-individualistic creatures and other accounts have presented human persons as brainbound thinking things, however this conception of persons (hyper individualistic and brainbound) fails to connect with daily human experience in which persons are more

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[1] Margaret Walker (2007) offers a good account of this in her treatment of representational practices in *Moral Understandings.*

[2] I adopt the term "brainbound" from Clark (2008a).

accurately understood as properly dependent social creatures that often employ material artifacts and built environments in order to scaffold and thereby distribute some aspects of their thought processes. In line with MacIntyre's insight in the epigraph above, moral philosophy needs to account for this alternate conception of persons, and, even more, to develop ethical analysis that is responsive to the peculiar forms of harm and wrongdoing that specifically afflict persons who are understood as dependent and situated rather than hyper-individualistic, brainbound thinking creatures.

Dependent Persons

To start, I offer a picture of human persons as fundamentally 1) dependent and 2) situated thinking creatures. I consider each of these human attributes, being dependent and being situated, in turn. Over the past thirty plus years, feminist philosophers have done important work exploring and emphasizing the relational underpinnings of human existence, and the fact and significance of human dependency as it bears on traditional philosophical issues such as justice (Kittay 1999), practical identity (Lindemann 2002, 2009; Young 1997), and autonomy (Mackenzie and Stoljar 2000; Meyers 2004; Nedelsky 1989; Code 1991) to name only a few.[3] Kittay (1999), in particular, offers the crucial observation that prior to anything like Rawls's (1999) account of the original position and the just distribution of resources amongst free equals in a society, there is a structure of caring that must be attended to first. Human beings are not sprouted from the ground like mushrooms (Hobbes 1651, VII.1), islands of rational thinking unto themselves, but rather

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[3] Political communitarians such as Michael Sandel (1998) and Alistair MacIntyre (2007) have also offered considerable critique and analysis of the liberal ideal of the self-sufficient individual and instead have emphasized the priority of and need for human community.

they are born into families and communities on whom they are completely dependent to defend and nurture their life, satisfy basic needs for food, water, and shelter, and also promote their interests (education, security, privacy) in the larger society. Not only infants and small children, but also adults during serious illness or injury, as well as the frail elderly near the end of life, are all deeply dependent on other people to care for them. In short, when we take into account the entire human lifespan, namely childhood and old age, along with the ongoing susceptibility to disease and injury throughout, we see the depth and pervasiveness of human dependency.

Yet, Kittay (1999) goes further to astutely observe that, beyond certain biological realities that precipitate a need for care by another person, the structure of caring within a market based economy can generate additional dependencies. For example, the care worker, particularly the familial care worker, may depend on another individual to act as a provider of important resources (food, money, shelter) necessary to both care for herself and her charge (Kittay 1999). Thus, the care worker and provider may arrange a kind of bargain in which care work is exchanged for important external resources; however, because the care worker cannot simply walk away from any proposed bargain without risking the wellbeing of her charge, she is in a worse bargaining position than the provider, and, thereby, a greater state of dependency (Kittay 1999). Human beings then are more or less dependent on others because of certain biological and psychological afflictions and also because of the structure of any given society, especially with respect to political and economic relationships in the society. What begins to take form is a complex map of dependencies in any given society in which, not only are considerable numbers of people dependent on the care of others at different stages in life and throughout life, but also dependencies of varying kinds overlap and intersect to create more compound forms of dependency. Of course, some of the dependencies on this map shade into forms of oppression and domination that should be challenged, while others provide examples of the morally admirable and relentless human effort to repair, preserve, and maintain relationships with one another. Although some dependencies may be reduced in a more just society, some level of human dependency and the dependencies generated from caring for dependents remain inescapable realities of any human society and, accordingly, must be attended to in any adequate conception of human persons that is deployed within a system of moral philosophy.

Hilde Lindemann (2002) deepens and extends these insights regarding the basic need for human relationships and care with respect to issues of practical identity—that is who we take ourselves to be, what we care about, value, and hope for as we navigate everyday life.[4] On Lindemann's approach, both first and third personal narratives about a particular embodied subject or self constitute and shape the development of a practical identity that allows us to make choices, mediate relationships, and navigate daily life. Of course, we are not born into this world with a fully formed practical identity, but, instead, a family provides the narrative beginnings of a practical identity that is both retrospective (how an individual came to be and has been), as well as prospective (what an individual may become) by telling stories about the child to the child and to others. We are, as

[4] Marya Shechtman (1996) has usefully clarified issues of personal identity by distinguishing the re-identification question (What makes a person at t_1 the same as the person at t_2?) from the characterization question (What beliefs, values, desires and other psychological features make someone the person that she is?). Here and elsewhere I am concerned with issues of characterization and not re-identification.

Annette Baier (1981, 180) aptly puts it, “second persons;” we are “long enough dependent on other persons to acquire the arts of personhood.” However, in some cases an individual may never develop the capacities to tell her own story (e.g. in cases of severe cognitive impairment) and, thereby, contribute first personal narration to her practical identity. In still other cases, an individual who has until now successfully crafted a first personal narrative to constitute a practical identity may lose the ability to do so (e.g. in cases of dementia). In these cases, which afflict at least some humans and potentially any human being, Lindemann (2002, 2009) observes that we have the ability to hold an individual in a sense of morally significant personhood by knitting together a network of narratives about the person that maintains her place in the social order and bestows on her a certain degree of recognition and respect. That is, on Lindemann’s analysis, not only are our practical identities an expression of human relationality insofar as they consist of both the narratives we tell about ourselves and the narratives others tell about us, but at points in our life the ongoing maintenance and preservation of our practical identity is dependent on the efforts of others to hold that identity in place through diligent and thoughtful labors to tell and re-tell significant identity constituting narratives. A paradigm instance of this process is perhaps when an individual is comatose and family and friends must provide the narrative underpinnings of the person’s identity so as to guide medical treatment and maintain a certain amount of recognition and respect in the otherwise mechanistic medical system. Whether or not such efforts to hold an identity in place are always successful or even attempted, the need to have our identities held in place by others either when we do not develop certain cognitive capacities, or when we temporarily or permanently lose some cognitive capacities, is persistent. Lindemann's insight here is important because she underscores the sense in which we are not only dependent on other persons for basic material resources, such as food, shelter, and water, but we also depend on other persons to help us develop our sense of who we take ourselves to be and to maintain that sense of who we are/who we have been through difficult life events (such as the onset of dementia or an induced coma following severe brain damage). This is not to suggest that we are simply what others tell us to be; that would deny an important current in feminist philosophy that has sought to analyze sources of oppression and domination in an effort to make room for free, individual decision-making and development. However, it does point to the complex way in which becoming free individuals involves recognizing our dependencies in various respects.

But, if we are not careful, we may construe human dependency as strictly an issue of human relationships. Iris Marion Young, though, helps us to avoid that error by drawing our attention to our non-trivial dependency on the built environment. While the home has and can be a site of abuse and injustice, it also serves positively as a vital structure for the maintenance of our practical identities (Young 1997). As Young (1997) observes, we structure our homes not in just any way, but rather in ways that reflect how we, as concrete and specific individuals, live, think, and remember. She remarks,

> A home, on the other hand, is *personal* in a visible, spatial sense. No matter how small a room or apartment, the home displays the things among which a person lives, that support his or her life activities and reflect in matter the events and values of his or her life. There are two levels in the process of the materialization of identity in the home: (1) my belongings are arranged in space as an extension of my bodily habits and

> as support for my routines, and (2) many of the things in the home, as well as the space itself, carry sedimented personal meaning as retainers of personal narrative. (Young 1997, 149-150)

As human beings, she argues, we are not merely brains or bodies alone, but our chosen and personally shaped environments become an extension of our subjectivity as well. In this way, the dynamic of homemaking (arranging and re-arranging objects, cleaning, dusting, repairing) is immeasurably deep insofar as individuals use their dwelling places as means to express and maintain their practical identities for themselves and others (Young 1997). As Daniel Miller (2008) describes an elderly, nearly blind, south Londoner:

> In Jenny's case the key is dusting. There is dusting which is a chore inherited from the tyrannical domesticity of past times, a form of work for work's sake. But dusting can also be more like an excuse for a repeated re-acquaintance with each and every object in the home. For Jenny, in her blindness, one can feel that dusting is just such an opportunity. It is the way she can pick up, touch, replace and recollect each item in turn. That's why Jenny says she can only dust when she feels like dusting. For example, when the family has been around and she has been talking about the old days. Then dusting became this point of physical re-attachment, filling the emptiness after the family has left. (213)

The objects at the center of homemaking become sites for telling and re-telling stories about one's self or family or social group—not merely in the sense of cueing the memory of a particular event, rather, also by serving as "props and characters" in the telling of various stories such that the structure and layout of the home proves vital to enacting the history and imagining the future of a person/family/group (Young 1997, 151). Consider Miller's (2008) comments on Elia, another South Londoner, with an extensive wardrobe,

> Almost all [Elia's] clothes represent not just things to wear but integral aspects of her relationships with others. Two of her most present ancestral ghosts reside within this wardrobe: her aunt Dimitra and her mother. Many

> of the garments were made originally by Dimitra, often in the first instance for her mother. As one goes through the wardrobe, garment by garment, a high proportion of them speaks to some relationship…With some people, one would look at this array of clothes and see each as representing a person, or an event. But the word 'represent' doesn't capture Elia's sense of objects as forms that actually mediate and transfer substance and emotion between people. When she wears a borrowed dress to a dance, the compliments she receives are also flowing to the friend, not just to herself…Objects store and possess, take in and breath out the emotions with which they have been associated. Not surprisingly, to clear and tidy this room [her wardrobe] is for her the means to clear and tidy her head and—a term which is important to her—her soul. (37-38)

Interestingly, Young's and Miller's insights about the role of material structures and objects in supporting and sustaining various personal habits and aspects of our identity intersect and resonate with the growing study of situated cognition in the cognitive sciences. This vein of research underscores that human persons are not only dependent creatures, but are also situated in the sense that their thinking processes are realized by the coordination and utilization of the brain, body, and artifacts and structures in the world.

Situated Thinking Creatures

Famously, Descartes (1993, 53 and 86) described himself as a fundamentally un-extended thinking thing. Other philosophers since Descartes have answered differently in asserting that we are extended (physical) thinking things, by which they meant that thought processes are basically, if not exclusively, neurophysiological processes in the brain. Such has been the standard view in the cognitive sciences in the 20th century, during which time this physicalist thesis was marketed as the compelling alternative to Descartes' mind-body dualism. Mark Rowlands (2010, 11-13) astutely observes, though, that, despite the different qualitative ascriptions both Descartes and his critics make about the kinds of thinking creatures that we are, they both assume a common location for mental processes, namely the brain as a whole or a smaller region of the brain (e.g. the pineal gland).[5] This privileging of what happens in the head is manifest in the tendency (sometimes referred to as psychological individualism or methodological solipsism) to treat the study of the brain and its associated activity apart from physical and social environments as sufficient for understanding cognitive processes (see Putnam 1975, 136-137; Wilson 2010, 169-170). But, as Merleau-Ponty (|1942| 2008) endeavored to show, this methodology frequently results in what he termed "laboratory behavior," which does not capture the complexity and range of human behavior at it exists within the milieu of everyday, lived situations.

Researchers since Merleau-Ponty have developed and expanded on this line of thinking by attending more closely to the role of artifacts and the environment in shaping and enabling specific human cognitive processes (see Gibson 1986). Recent work in the philosophy of mind and more broadly in the cognitive sciences (see Rowlands 2010; Clark and Chalmers 1998; Clark 1997, 2004, 2008a; Wheeler 2005; Menary 2010; Robbins and Aydede 2008; Sterelny 2010; Noe 2009) has ventured the provocative idea that specific cognitive tasks such as remembering X, reasoning through problem Y,

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[5] For example, (Descartes 1989, Article 31) writes, "It is also necessary to know that, even though the soul is joined to the whole body, there is nevertheless one part in [the body] in which [the soul] exercises its functions in a more particular way than all the others…I seem to have plainly ascertained that the part of the body in which the soul immediately exercises its functions is in no way the heart; it is not the whole brain either, but only the innermost of its parts- a certain extremely small gland, situated in the middle of its substance." And Adams and Aizawa (2010, 17) write, "So strictly speaking, we maintain that the orthodox view in cognitive science is not that cognitive processes necessarily take place within the whole of the brain, but perhaps only within a subset of the neurons constituting the brain… Even if only a subset of the brain's neurons is involved in cognitive processing, it will be the case that cognitive processing is entirely intracranial."

perceiving Z, etc., are realized through ongoing, reciprocal interactions between brain, body, and artifacts in the world.[6] Thought is not a strictly brainbound endeavor, but instead depends on the ways in which the brain and body engage with specific extraorganismic resources to carry out particular cognitive processes or tasks. Although there are a variety of labels that describe this general account of human cognition or variations on this account (e.g. the extended mind, extended cognition, embedded cognition, embodied cognition, enactivism, extended functionalism, the scaffolded mind, active externalism, vehicle externalism, cognitive ecology), I follow Robbins and Aydede (2008) in adopting the practice of calling the broad research program that examines the ways in which human cognition either depends on or is constituted by the human body and/or the body's engagement with the physical and social worlds, "situated cognition."

While situated cognition represents a broad genus, there is a range of species of situated cognition that can be termed embodied, embedded, enacted, and extended. Each of these more specific hypotheses of situated cognition offer different accounts of precisely what it might mean to say that thinking processes are realized by or constituted by the body and extraorganismic artifacts.[7] For the purposes of my project, it is not necessary to set forth a detailed account of each of these theses and the variations suggested by their defenders. What is important is that I make clear the value of

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[6] These more recent insights are not without precedent. Wheeler (2005) roots his conception of extended cognition in the work of Martin Heidegger, while other theorists of embodied, extended, and embedded cognition often make reference to work by Maurice Merleau-Ponty (see Gallagher 1986, 2006; Thompson 2007). Gallagher (2009) provides an excellent account of some of the philosophical precursors to present research on situated cognition, citing in particular Dewey, Heidegger, Merleau-Ponty, and Wittgenstein.

[7] For some of the most sustained and well-known philosophical criticisms of the various species of situated cognition (especially accounts of extended cognition) see Adams and Aizawa (2010).

extraorganismic resources in carrying out specific cognitive processes. My goal is to show that if we want to understand how some organism carries out cognitive tasks such as remembering, reasoning through a problem, and planning, it is vital to attend to both what is happening in the brain and also amidst the body's integration and engagement with objects in the world. To do that, I offer a detailed review of Andy Clark's account of extended cognition, which will serve as a particularly helpful reference account within the situated cognition literature and also conveys some of the philosophical and scientific arguments and studies that are being drawn on to argue that human cognition is profoundly enmeshed with the built environment.[8]

Though Andy Clark is by no means the only philosopher of mind who advances the extended mind/extended cognition hypothesis, he is certainly one of the major proponents of the position, and has been remarkably productive in continuing to defend and advance his ideas over the past decade.[9] Clark argues that the human mind is not

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[8] I chose, in this chapter, to present Clark's extended mind/cognition account because he offers one of the clearest and most comprehensive accounts of a form of situated cognition. Additionally, Clark's account does an especially good job of showing the cognitive significance of material objects where otherwise the temptation is to treat the brain as a self-sufficient thought processing machine and to study it largely separate from the world of things (for example, the methodological approach of psychological individualism dictates that "psychological states should be construed without reference to anything beyond the boundary of the individual who has those states" [Wilson 2004, 398]). The ethical claims I make in the next chapter do not depend strictly on Clark's precise account of situated cognition, or, in particular, on his claim of constitution or literal extension of cognitive processes. Instead, what is important is the dependence of specific cognitive processing tasks on ongoing reciprocal interactions with extraorganismic resources.

[9] Other defenders of some kind of extended mind/cognition position are Mark Rowlands (2010), Richard Menary (2010), and John Haugeland (1998). Clark sometimes refers to his thesis as "extended cognition" and sometimes as the "extended mind." I follow Mark Rowlands' (2012) convention in stressing that much of the discussion is about the nature of cognitive processes, and therefore refer to Clark's account and other similar positions as accounts of "extended cognition." This helps to avoid some of the philosophical baggage associated with talking about the "mind" and also serves to emphasize the dynamic, process oriented nature of thinking as opposed to a static set of beliefs.

rigidly identifiable with the brain alone, but rather its central activity, cognition (remembering, perceiving, reasoning), can be realized by elements of the body and world in conjunction with the brain at various times and places. Thus, to cite a basic example in the literature of the extended cognition thesis, when a mathematician or physicist utilizes pencil and paper to calculate numerical sums, he is not simply interacting with merely inputs and outputs to the thought process taking place within his brain, but rather the thought process is better identified as distributed between the manipulation of letters and symbols on the paper and activity in his brain (see Clark 2008a, xxv-xxvi). As Clark (2008a, xxviii) describes the extended cognition position:

> …thinking and cognizing may (at times) depend directly and noninstrumentally upon the ongoing work of the body and/or the extrorganismic environment…the actual local operations that realize certain forms of human cognizing include inextricable tangles of feedback, feed forward, and feed around loops: loops that promiscuously criss-cross the boundaries of brain, body, and world.

While there is much to attend to in this articulation of the position, it is important to first observe that Clark's account (and other similar accounts) of extended human cognition *does not* amount to the position that human cognition merges into a universal mind that pervades existence. This point will become clearer in the following discussion of Clark's arguments, but for now it will suffice to emphasize that minds or thought processes remain discrete and centered on bodily individuals, even if they are nonetheless extended beyond the boundaries of skin and skull.

To understand Clark's position, it is helpful to recognize his place in the history of the philosophy of mind and the kinds of resources that he is drawing on. Evan Thompson (2007) has usefully organized the past sixty years of work in the philosophy of mind under the historical categories of "cognitivism," "connectionism," and "embodied dynamism." Cognitivism, which dominated during the 1950s through the 1970s, was a reaction to the Behaviorists of the first half of the century, and was strongly influenced by the metaphor of mind as computer, wherein various programs in the brain translate and manipulate symbols in syntactic fashion. Closely allied with cognitivist models was the functionalist position, which argued that it was the role or function of various mental states (the software) that was *most* important in recognizing a mind, and not the specific physical hardware that realized the mental state (Thompson 2007, 5). In the 1980s, the "connectionist" model came into prominence. This approach regarded the mind less as a computer and more as a neural network structured by rules and representations (Thompson, 2007, p.9). In the 1990s, a new approach became influential, which Thompson calls "embodied dynamism," but could also be called "situated cognition." This new trajectory models the human mind as an "embodied dynamic system in the world," whereby reciprocal feedback loops between brain, body, and world are established to facilitate and/or realize human cognition (Thompson 2007, 11). It is precisely in this phase of "embodied dynamism" or "situated cognition" that Clark's work is to be located.[10]

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[10] Importantly, Clark's account of extended cognition does share important connections with past work in the philosophy of mind. For instance, he espouses what he terms a "commonsense functionalism" that is a version of functionalism, and thus he argues that objects besides neural matter might realize aspects of cognitive processes if they assume the right functional role in the overall cognitive system (Clark 2008a). Additionally, in their original paper, Clark and Chalmers (1998) located their account as a radical extension of the kind of externalism about mental contents that Robert Putnam (1975) and Tyler Burge (1979) first explored in separate articles in the 1970s. Clark and Chalmers called their account a kind of "active externalism" by which they meant to put the emphasis on artifacts serving as the vehicles for mental contents.

There are two central components operating throughout Clark's account of/argument for extended cognition, which I term "prejudice disruptors" and "refinement mechanisms." Each of these mechanisms is sometimes expressed in a more philosophical or empirical version. Prejudice disruptors are philosophical arguments or empirical evidence that are utilized to challenge or upset the longstanding assumption that the mental is *confined* to the brain, though it is still recognized as centered/oriented around the brain. Refinement mechanisms are philosophical arguments or empirical evidence that are utilized to more fully describe and advance the extended cognition position once the skin and skull based prejudice for mental occurrences is at least disrupted. Each of these components (prejudice disruptors and refinement mechanisms) reinforces one another so as to create the strongest position for the extended cognition position. If the various arguments that Clark makes are read in a one-dimensional fashion, this distinction between prejudice disruptors and refinement mechanisms disappears. But then, too much weight is being placed on those arguments that are properly understood as prejudice disruptors. That is, prejudice disruptors are simply intended to prime our intuitions about cognition, and get us thinking about things in a new way. They are not meant to be full-blown arguments for the extended cognition position.

The philosophical versions of Clark's prejudice disruptors and refinement mechanisms have been most forcefully presented in his early article, published in 1998, with David Chalmers, called "The Extended Mind." Therein, Clark suggests two thought experiments that can generally be classified as a prejudice disruptor and a refinement mechanism respectively. The first (the prejudice disruptor) involves three imagined variations on individual problem solving (this example is patterned on the handheld video game called "Tetris") (Clark 2008a, 220-221):

(1) A person sits in front of a computer screen which displays images of various two dimensional geometric shapes and is asked to answer questions concerning the potential fit of such shapes into depicted "sockets." To assess fit, the person must mentally rotate the shapes to align them with sockets.

(2) A person sits in front of a similar computer screen, but this time can choose either to physically rotate the image on the screen, by pressing a rotate button, or to mentally rotate the image as before. We can also suppose that some speed advantage accrues to the physical operation.

(3) Sometime in the cyberpunk future, a person sits in front of a similar computer screen. This agent, however, has the benefit of a neural implant which can perform the rotation operation as fast as the computer in the previous example. The agent must still choose which internal resource to use (the implant or the good old fashioned mental rotation), as each resource makes different demands on attention and other concurrent brain activity.

Clark and Chalmers accordingly argue that:

1. Human cognition is clearly taking place in case #1.
2. Case #1 (mental rotation) seems to be meaningfully analogous with case #3 (cyber-punk implant).
3. The rotate button and computer screen of case #2 is substantially similar to the cyberpunk implant of case #3, with the exception that the user+rotate button+computer screen is distributed across brain-body-world in contrast to just the brain in each respective case.
4. There is no reason, aside from skin and skull prejudice, that case #3 (cyber punk implant) should count as cognition while case #2 (physical button rotation) does not.
5. Therefore, all three cases should be understood as instances of cognition.

Generalizing from this thought experiment, Clark sets forth what has come to be known as the "Parity Principle," which states:

> If, as we confront some task, a part of the world functions as a process which, were it done in the head, we would have no hesitation in recognizing as part of the cognitive process, then that part of the world is (so we claim) part of the cognitive process (Clark 2008a, 222).

Later in his work, Clark (2008a, 121) introduces the Cognitive Impartiality Hypothesis as a companion to the Parity Principle:

> Our problem-solving performances take shape according to some cost function or functions that, in the typical course of events, accord no special status or privilege to specific types of operations (motoric, perceptual, introspective) or modes of encoding (in the head or in the world).

In short, in an effort to minimize the costs associated with cognition (time, energy, accuracy, detail), we may variously and without prejudice adopt either strictly internal, mental mechanisms or also utilize bodily and environmental resources.[11] Taken together, these seemingly reasonable principles are meant to challenge the assumption that all cognition is necessarily brain bound. Given the legitimate possibility that cognition

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[11] Sterelny (2004) observes that when we offload or scaffold some aspects of our thought process, while we accrue some cognitive benefits/advantages, we also make it easier for another individual to alter or manipulate the external resource and thereby risk a certain amount of deception which we then must take steps to prevent. This gives insight into the trend in the design of smartphones to implement greater security measures so that no one except the smartphone owner can access its contents. Where previously a simple numeric code was employed to keep out trespassers, Apple's most recent iPhone (the iPhone 5s) employs a fingerprint detection button to lock and unlock access to the phone. In this manner, steps are not only taken to decrease the risk of someone else altering or manipulating the contents of the phone, but also steps are taken to decrease the amount of energy expended to safeguard and protect the information in the external resource. In more recent work, Sterelny (2010) acknowledges that in his 2004 article he assumed too much of a Machiavellian social situation, and admits now that sometimes utilizing external resources that are shared with others can actually increase the accuracy of information in the resources and therefore prove more reliable (e.g. a collaborative workplace wiki).

extends beyond skin and skull, Clark goes on to refine his philosophical position with the famous Inga-Otto thought experiment.

Paraphrasing Clark and Chalmers (1998), consider a normal case of belief drawn from memory. Inga wants to go to the Museum of Modern Art (MOMA). She then thinks about where MOMA is, remembers that it is on 53rd St., and accordingly walks to the museum on 53rd St. Now imagine Otto, who suffers from Alzheimer's disease, and accordingly relies on "information in the environment to structure his life" (Clark 2008a 226). Otto utilizes a journal that he always carries with him to write down and store pertinent information for his daily life. Just like biological memory, when Otto needs some piece of task-oriented information, he turns to the notebook. Otto wants to go to MOMA today, and accordingly takes out his notebook and looks up where MOMA is located (53rd St.), and thereupon walks to the museum on 53rd St.

Clark's argument is that the conjunction of Otto's relationship to his notebook, along with the actual content of the notebook, yields beliefs that determine actions in the same way in which Inga's biological memory supplies beliefs that determine actions. Clark is not suggesting that memory operates just like written words in a notebook, but that the functional poise of the information derived from biological memory and the notebook are analogous (Clark 2008a, 88). In both cases, Inga and Otto want to go to MOMA, and accordingly use biological memory and the notebook respectively to supply the precise location of the museum. Thus, the desire (I want to go to the museum) plus the belief (I know that the museum is on 53rd St.) yields an action (I am walking towards

53^{rd} Street). In this example, the Parity Principle is certainly in the background, however, Clark uses the scenario to further refine the extended cognition position.

> Otto's notebook is not just any resource amongst other resources. Significantly,
>
> …the notebook is a constant in Otto's life.... Second, the information in the notebook is directly available without difficulty. Third, upon retrieving the information from the notebook he [Otto] automatically endorses it. Fourth, the information in the notebook has been consciously endorsed at some point in the past, and indeed is there as a consequence of this endorsement. (Clark 2008a, 231)

Otto's notebook gains special significance relative to its tight coupling with Otto throughout his daily life. Just as the normal use of biological memory is relatively automatic and fluid, so also is Otto's use of his notebook (Clark 2008a, 80). More particularly, the cognitive significance of the notebook cannot be understood apart from Otto's use of the notebook in adopting certain courses of action. Clark generalizes these observations in order to set forth criteria necessary for non-biological candidates to be included in some organism's memory processing and belief forming systems (Clark 2008a, 79):

(1) That the resource be reliably available and typically invoked.

(2) That any information thus retrieved be more or less automatically endorsed. It should not usually be subject to critical scrutiny (e.g. unlike the opinions of other people). It should be deemed about as trustworthy as something clearly retrieved from biological memory.

(3) That information contained in the resource should be easily accessible as and when required.

(4) That the information in the [resource] has been consciously endorsed at some point in the past and indeed is there as a consequence of this endorsement.

These criteria work reasonably well when applied to memory processing, such as in the cases of Inga and Otto.[12] However, the criteria need to be adapted and developed further in order to be applied to other forms of cognitive processing (e.g. reasoning). For example, Clark describes the mathematician's use of paper and pencil as a form of extended cognitive processing. However, contrary to the criteria specified above, the mathematician may only occasionally utilize paper and pencil, but it would still appear to be an instance of extended cognitive processing when it does occur. Similarly, calculations are not on the paper as a result of previous endorsement, but instead for the purposes of discovery. Additionally, the results are likely not automatically endorsed, but may in fact be scrutinized for accuracy much the way that a purely mental process of reasoning might also be scrutinized for accuracy.[13]

While Clark's criteria are not general enough to be widely deployed to all forms of external cognitive processing, they do capture the important insight that external props

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[12] Though it should be noted that criterion #2 pursues parity between external and internal resources, when it may be that an external resource compliments internal resources so as to extend/enhance the capabilities of the particular cognitive process in question. Where an external resource compliments instead of merely replicating an internal process, the information obtained from that resource may actually be considered more reliable or trustworthy. John Sutton (2010) has made this point as well in suggesting that first-wave approaches to extended cognition emphasized parity between internal mechanisms and external mechanisms, but a second-wave of extended cognition accounts are pursuing the idea that extended cognitive process may compliment/enhance biological capabilities, rather than merely replicate them in an externalized form (see for example Gallagher 2013; Malafouris 2013)

[13] Gallagher (2013) has also noted similar concerns about whether these criteria are as generalizable as Clark and Chalmers (1998) initially may have intended them.

(such as Otto's notebook) realize cognitive processes only relative to a biological agent with the kind of distinctive neural hardware that facilities such integration and extension (Clark 2008a, 123). This is the point in emphasizing that Otto's notebook is not cognitively significant in and of itself, but only inside of the distinctive task-oriented relationship with Otto, the biological agent. In this manner, Clark and other extended cognition theorists are able to maintain the existence of discrete and personal minds. Cognition is not organism-bound on the extended cognition position, but it does admit that cognition is organism-centered (Clark 2008a, 123).

Amidst these more philosophical arguments for the extended cognition position, Clark spends a significant amount of space considering possible empirical evidence as well. The empirical correlate to Clark's prejudice disrupting thought experiment (mentally or physically rotating various shapes to be fitted into a "socket") is work by Kirsh and Maglio on the game of Tetris (Clark 2008a, 70-73). In short, Kirsh and Maglio (1994) discovered that expert Tetris players do not spend time rotating zoid shapes in their heads before physically manipulating a keypad to insert a zoid into place. Instead, expert players immediately begin to physically rotate the zoid shapes on the computer screen so as to determine the best orientation to insert into place. In their analysis of these findings, Kirsh and Maglio (1994) coined the term "epistemic action" over and against "pragmatic action." Pragmatic actions are "those actions whose primary function is to bring the agent closer to his or her physical goal" (Kirsh and Maglio 1994, 515). By contrast, "epistemic actions—physical actions that make mental computation easier, faster, or more reliable—are external actions that an agent performs to change his or her computational state" (Kirsh and Maglio 1994, 514).

Like an expert Tetris player, David Esterly (2012), who is a master wood carver, describes his process of developing a carving, "If this were my carving, I'd quickly waste away down to an appropriate level, then draw the shape on the wood and start to model it. Or I might rough out a form and model it down lower and lower, experimenting with different shapes as I went, settling on one where I reached the right level" (201). Esterly's brain is not doing all of the work of imagining the final product and reasoning through various paths and possibilities; instead, Esterly distributes pieces of information between both his brain and the environment, such that the process of imagining how to form the wood involves a reciprocal interaction between his brain, body, and world. Esterly is not imagining everything in his head by manipulating mental representations, but instead he is actually using physical manipulations of an object as a type of epistemic action to realize/facilitate parts of the process of imagination and reasoning about the final work. In this case and others, cognition does not depend on a rich and complete, internal representation developed in advance of the work to be done, but instead uses the world itself as the material for cognitive processing.[14]

[14] Rodney Brooks (1991) has famously pioneered groundbreaking work with intelligent robots on precisely this basis, namely that the world can serve as its own best representation. Previously, roboticists had unsuccessfully attempted to program intelligent robots with a plethora of information about the environments that the robot would need to navigate and interact with. Brooks and his team though developed robots that are not programmed with information about the environment, but instead are programmed for action routines that force the robot to constantly interact with the environment and adapt to various obstacles encountered therein. The robot does not generate any kind of rich internal map of an environment, but instead continually interacts with the environment to uncover relevant information. Today, the results of Brooks' design approach can be seen in the Roomba vacuum cleaners that are able to navigate unfamiliar homes while nonetheless working autonomously to comprehensively sweep and *Footnote continues on the next page.*

Empirical versions of refinement mechanisms for the extended cognition position are glimpsed in research that shows that objects can become relatively easily integrated into the neural representations of the body. Clark (2008a) especially emphasizes research by Maravita and Iriki (2004) on Japanese macaques in which they discovered the presence of bi-modal neurons in the brain. These bi-modal neurons respond to both somatosensory and visual information around or at a common body part (e.g. the hand). Interestingly, after only five minutes of using a rake to reach for food placed outside the reach of its arm, neural readings from the macaque showed that bi-modal neurons that had previously responded to visual and somatosensory stimuli around the hand now responded to visual stimuli along the length of the rake, as though the rake had become integrated into the neural representation of the body.[15] As Maravita and Iriki indicate, this research seems to provide neurological evidence of the plasticity of organisms' body schema—that is, their pre-reflective, proprioceptive awareness of bodily position. The body schema not only tracks the physical body of an organism, but actually can integrate other objects and tools so that, with practice, the object can be as fluidly and

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vacuum all of the floors. Kevin O'Regan's work on change blindness in humans (see O'Regan et al. 1999) indicates that human visual perception may operate in a similar manner. Change blindness occurs when "major changes [in a scene] are missed when they occur simultaneously with a visual disruption caused by an eye movement, a flicker, a blink, or a camera cut in a film sequence" (O'Regan et al. 1999). As a result, O'Regan et al (1999) hypothesize that human beings do not appear to form a highly detailed internal representation of what they see, but instead only encode a rough internal representation around central features of interest. Nonetheless, we have the experience of a rich visual display because we are able to continually interact with the visual scene before us.

[15] Bassolino et al. (2009) obtained similar results in humans that regularly used a computer mouse. Researchers found that when test subjects held or actively used a computer mouse they had similar reaction times to audio and tactile stimuli presented near the hand and in the far space of the computer screen. Researchers posited that the routine use of the computer mouse expanded the test subjects' auditory peripersonal space, much the way that a blind individual's peripersonal space seems to be extended by the use of a cane.

unselfconsciously deployed as legs and feet in the familiar routine of walking to the grocery store.

The integration of the object into the organism's bodily repertoire can be observed both by attending to neural representations and also phenomenological description of a subject. As Merleau-Ponty (|1945| 2012, 144-145) eloquently observed nearly sixty years in advance of present day neurological research:

> Without any explicit calculation, a woman maintains a safe distance between the feather in her hat and the objects that might damage it; she senses where the feather is, just as we sense where our hand is. If I possess the habit of driving a car, then I enter into a lane and see that "I can pass" without comparing the width of the lane to that of the fender, just as I go through a door without comparing the width of the door to that of my body. The hat and the automobile have ceased to be objects…They have become voluminous powers and the necessity of a certain free space…To habituate oneself to a hat, an automobile, or a cane is to take up residence in them, or inversely, to make them participate within the voluminosity of one's own body.

When this kind of deep integration into the body schema occurs, it is a mischaracterization to regard the organism and tool as completely separate entities. That is, the object is not merely an input to the bodily system, but instead becomes part of the bodily system that is unified by its fluid mobilization for a particular task (e.g. walking, driving, etc.).[16] By means of a plastic and adaptable body schema, objects become part of our lived relationship to the world. The feather, rake, or automobile, once integrated into our bodily performances, fundamentally alters and shapes how we perceive and behave in the world. This kind of embodied relationship with artifacts is significant in indicating the

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[16] Heidegger (1962) offers a similar insight in his analysis of the structure of the experience of using a tool, whereby the tool recedes from conscious awareness and is ready to hand as it becomes fluidly deployed for a particular task as opposed to becoming the subject of conscious attention (present to hand) when it breaks and interrupts the task.

kind of fluid and reliable deployment of some external resources for cognitive processing in which there is a tight reciprocal relationship evidenced by feedback and feedforward loops over the space of brain, body, and world. We can imagine that Otto-like individuals deploy their notebooks with respect to the process of remembering as adeptly and as integrally as the woman with a feathered hat does with respect to her perception of the world. In each respective case, the process of remembering or perceiving is dynamically shaped by the ongoing interaction between an individual and some object. Just as the woman with the feathered hat readily perceives how *she* can move in and about the world—what she is capable of—on the basis of her deep assimilation of the feathered hat into her bodily comportment, so also Otto-like individuals experience their capacity to remember on the basis of their fluid use of the notebook or other similar technology.

The culminating insight of Clark and other extended cognition theorists is that embodied human beings, whether suffering from Alzheimer's disease (e.g. Otto) or not, can and do utilize physical artifacts and arrangements of artifacts in the extrorganismic world to realize cognitive processes such as perception, remembering, reasoning, problem solving, and decision making. As Michelle Hlubinka describes in her easily relatable experience of losing her datebook:

> And then one spring, I lost my datebook. I felt as though I had lost my life. My memory of all I did and planned to do from January to May 2003 vanished, along with the physical form that contained it…My datebook enabled me to weave a matrix of possibility: I would often note three concurrent events that sounded equally enticing, and at the last minute my whims would direct me to one of them or to cross them all off my list…I think of my lost datebook as an external information organ- a piece of my

> brain made out of paper instead of cells. Knowing it was nearby helped me relax. (Turkle 2007, 79)

Thus, while our reliance on external resources to carry out certain cognitive processes may be more pronounced during periods of illness, injury, or cases of biological cognitive impairment, it seems to be a practical epistemic strategy for all human beings some of the time and to varying degrees. Few of us can perform complex math equations without paper and pencil, or remember phone numbers without adroitly navigating our cell phone's address book, or otherwise develop thoughtful philosophical arguments without writing initial drafts and gradually amending, subtracting, and rearranging the words on our computer screen to arrive at the most consistent and clearest statement of our thinking. Similarly, artists and architects often sketch preliminary shapes and lines in order to explore possibilities for an eventual artwork or blueprint (Clark 2004, 76-77). David Chalmers, as a self-reflective user of the now ubiquitous iPhone, remarks:

> A month ago I bought an iPhone. The iPhone has already taken over some of the central functions of my brain. It has replaced part of my memory, storing phone numbers and addresses that I once would have taxed my brain with. It harbors my desires: I call up a memo with the names of my favorite dishes when I need to order at a local restaurant…I make plans with it, using its calendar to help determine what I can and can't do in the coming months. I even daydream on the iPhone, idly calling up words and images when my concentration slips. (Clark 2008a, ix)

By some estimates (see Dover 2012) there are 1 billion individuals, globally, with similarly equipped smartphones, any of whom may have comparable experiences to Chalmers.[17]

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[17] Accounts of situated cognition are not limited to strictly modern technologies. Evelyn Tribble (2005), for instance, provides analysis of the early modern theater (around the time of Shakespeare) in which actors had to learn sometimes multiple roles for as many as six plays each week. Tribble makes the case that
Footnote continues on the next page.

Situated in Space and Place

But, here it is important to be careful. If not appropriately contextualized, we might imagine an embodied subject merely suspended in a listless sea of objects available for cognitive appropriation. Often, though, the objects we most routinely recruit to carry out some cognitive function have been carefully positioned and assigned to spaces and places that we have deliberately constructed, shaped, and/or maintained, both for pragmatic goals such as protection, warmth, and community as well as epistemic goals such as remembering, making decisions, planning—what Kim Sterelny (2003, 2004) calls "epistemic niche construction." Ed Hutchins (1995) offers a great example of this kind of "epistemic niche construction" in his description of a commercial airline cockpit during landing and takeoff.

Just after takeoff and before landing, the pilots on a commercial airplane must extend a series of slats and flaps attached to the wings of the aircraft in order to keep the plane aloft at the lower speeds. This is a complicated procedure in which slats and flaps must be extended at just the right moment and in the right configuration while taking into account the airplane's speed and gross weight (which is always changing based on fuel consumption). In the cockpit of an MD-80, this procedure is handled through well-established routines that involve various objects and arrangements of objects in the cockpit to enable sophisticated cognitive processing of the various tasks necessary for the plane to take off and land safely. In the MD-80 cockpit there is a pilot flying (PF) and a

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actors were able to handle the enormous demands on their memory by scaffolding some portions of the memory task onto artifacts (e.g. the cue script) and other people in the theater.

pilot not flying (PNF). During landing, the PNF pulls out a booklet of speed cards (think of Otto with his notebook), in which each page represents a different gross weight for the airplane and specifies the speeds at which different configurations of slats and flaps should be extended or retracted. After determining the gross weight of the aircraft, and turning to the corresponding page in the speed card book, the PNF informs the PF of the various speeds at which various configurations of the slats and flaps must be extended or retracted. Thus, complex calculations are carried out through the coordinated use of a book of speed cards (much like Otto's notebook) that serves as an external memory and reasoning processing device. The PF then uses a series of markers (called "speed bugs") on the airspeed indicator to set a mark at each speed measurement in which a different configuration of the flaps and slats is supposed to be set. Then, as the PF decreases the aircraft's speed on approach for landing, he or she adjusts the slats and flaps as the airspeed indicator needle approaches each of the respective markers. What was previously a memory intensive task of maintaining various internal mental representations of the requisite airspeeds and correlating slat and flap values is instead converted to a more manageable perceptual task that spans brain, body, and world. In this manner, the pilots, with their artifacts (the speed book, the airspeed indicator panel and markers) arranged in particular configurations (e.g. in easy reach and control of each respective pilot to be used in sequence) demonstrate a carefully choreographed environment that achieves not only certain pragmatic ends, but also a variety of distinctly epistemic purposes as well.

Though it is perhaps obvious, it is worth stating that we think differently in different spaces and places. This is not just because of differing moods or kinds of work associated with various spaces and places, but also because different external resources are available for cognitive processing in those various spaces and places. We have more control over some spaces and places (for instance a home versus a shared office), and thus have varying degrees to which we can assign and arrange objects. Depending on our ability to organize and create durable arrangements of objects, we create more or less robust epistemic niches in which we not only carry out pragmatic projects, but also cognitive tasks.

Beyond having control over an environment, though, we are also more or less practiced in the use of objects and arrangements of objects depending on how familiar a particular space or place is. Thereby, we can be more or less adept at mobilizing specific resources for cognitive tasks in different spaces and places.[18] This underscores the special significance of the home as the place that, in the best circumstances, is secure, familiar, and can facilitate the reliable and stable configuration and appropriation of resources for cognitive processing of various sorts. Homes and similar kinds of spaces and places (the interior of a car, an office) are not merely the storehouses for the relics of a life and daily

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[18] Merleau-Ponty (|1942| 2008) in his early work, *The Structure of Behavior,* endeavored to show the dynamic relationship that was established between a living organism and its environment. He captures this point well in his description of the familiar field of play for the football player:

> For the player in action the football field is not an 'object'… It is pervaded with lines of force…and articulated in sectors which call for certain mode of action and which initiate and guide the action as if the payer were unaware of it. The field itself is not given to him, but present as the imminent term of his practical intentions; the player becomes one with it and feels the direction of the 'goal,' for example, just as immediately as the vertical and horizontal planes of his own body. It would not be sufficient to say that consciousness inhabits this milieu. At this moment consciousness is nothing other than the dialectic of milieu and action. (Merleau-Ponty 2008, 168-169)

endeavors. Rather, they are practiced places that help us to explore who we are, make decisions, and accomplish tasks by facilitating the effort to remember, reason, express ourselves, and perceive our world. Therefore, the extent to which any given person engages in forms of extended cognition will likely vary depending on the spaces and places that they are located in.

Embedded or Extended Cognition

A major source of debate amongst critics and proponents of extended cognition has been over precisely what might be involved in claiming that a cognitive process is literally extended into the extraorganismic world, or stated differently, to claim that an artifact is a *constitutive* part of a cognitive process (see Adams and Aizawa 2010; Fodor 2009). Some theorists, such as Rupert (2004) and Sterelny (2004, 2010), have argued for a supposedly weaker claim that "cognitive processes depend very heavily, in hitherto unexpected ways, on organismically external props and devices and on the structure of the external environment in which cognition takes place" (Rupert 2004, 393). This weaker/more conservative claim has been termed the hypothesis of embedded cognition. In contrast to theorists such as Clark, who argue that external props can and do *extend* cognitive processes beyond the brain and body, theorists such as Rupert and Sterelny argue that the use of external props in cognitive processing signals the profound ways in which the organism is cognitively *embedded* in his or her environment without necessarily being extended. Rowlands (2010, 69) parses each account as follows:

> …whereas the thesis of the extended mind was one of composition or constitution, the thesis of the embedded mind is one of *dependence*. According to this thesis, some cognitive processes are dependent on environmental structures in the sense that these processes have been

> designed to function only in conjunction, or in tandem, with these structures. In the absence of the appropriate environmental structures, an organism may be unable to accomplish its usual repertoire of cognitive tasks because the process it typically uses to perform such tasks works only in conjunction with missing structures. Or it may be able to accomplish these tasks, but in a less than optimal way– it takes longer for example, or exhibits a greater frequency of mistakes.

A commitment to merely embedded as opposed to extended cognition apparently avoids what some regard as the dubious ontological claims involved in accounts of extended cognition and is also supposed to offer a more useful explanatory framework in interfacing with existing research in the cognitive sciences regarding the nature of cognitive processing.

While there is a rich and interesting debate between the respective theorists as to whether cognitive processes are more accurately and/or usefully understood as embedded or extended, the details of that debate need not be rehearsed here because it does not have a significant impact on the ethical claims I eventually set out in next chapter. In particular, whether an object such as an iPhone is considered to be literally part of some cognitive process, such as a memory process, or whether the internal memory process is said to depend on the use of the iPhone as an external, epistemic tool, in either case the ethical significance, at least on my account, is the same. The success, accuracy, completeness, and/or efficiency of some organism's thought process is bound up with the use of a particular material artifact. To damage, alter, or steal that artifact is to, in turn, cause something ranging from a modest inconvenience to a major harm depending on the nature and purposes of the extended/embedded thought process affected.

An advantage of not staking my project on a strict claim of constitution versus dependence is that I can afford to be more liberal in which objects I consider to be substantially involved in cognitive processing. Therefore, I need not adopt Clark's stricter criteria (e.g. reliability, typical use, easily accessible, automatic endorsement, previous endorsement) to consider when a non-biological object might properly be considered a constitutive part of a memory process or belief forming system. Nor need I limit cognitively significant relationships to only objects in the environment, but can also include human persons. As such, I adopt the broad standard that a significant cognitive processing relationship exists between an individual and an object(s) or another person when the object(s)/person:

1. Is reciprocally engaged with during a specific cognitive process so as to achieve the completion of the intended cognitive task, such as remembering X or problem solving Y (e.g. an Alzheimer's patient's interaction with his memory notebook allows him to remember information he otherwise would not).[19]
2. And/or, an individual depends on engagements with an object(s) or person(s) to supply information in ways that allows him or her to perform a specific cognitive process
    a. Faster (e.g. the Tetris player mashing a keypad button to determine the best orientation for a zoid shape on the computer screen), or;

[19] My wording here is intended to claim much more than the simple fact that human beings eat certain foods to obtain energy that feeds general cognitive processing or breath oxygen that enables general cognitive processing. While food and oxygen are features of the environment that causally contribute to cognitive processing, and which we are dependent on, such features are connected with brain activity in general and are not deliberately engaged for specific cognitive processing tasks such as remembering my wife's phone number or calculating the product of 10,323 x 419.

b. More accurately (e.g. computing large or complex sums on paper), or;

c. More comprehensively (e.g. an artist exploring alternate possibilities through sketching in advance of creating the artwork).

This standard would countenance both one-off interactions and routine cognitive interactions with an object(s)/person, though the strength of the cognitive processing relationship will vary along at least three dimensions:[20]

1. Reliability
    a. The reliability of access to the resource (Clark 2008a; Sterelny 2010)
    b. The reliability of the information conveyed in or through the resource (Sterelny 2010)
    c. The reliability of the resource to function properly
2. Skillful Engagement
    a. Frequency of using a particular resource (Clark 2008a)
    b. Customization/individualization of the particular object (Sterelny 2010)
    c. Adaptation of physical routines to the particular resource (Sterelny [2010] calls this "entrenchment")
3. Plasticity
    a. Access to alternate means of carrying out some cognitive process/task
    b. Access to redundant forms of a resource (Sterelny 2010)

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[20] Kim Sterelny (2010) employs a similar though different set of categories/dimensions to explore various ways of relating to cognitive artifacts and persons.

The strength of the cognitive processing relationship might have a bearing on when a cognitive process is considered to be genuinely extended versus embedded, but it might also serve, as I argue in the next chapter, to shape our moral response to an individual when some objects are damaged or an environment (e.g. home) is destroyed.

Nonetheless, here and now, the important insight to take away is that the human ability to remember, think, reflect, plan, and make decisions often depends in vital ways on the coordinated organization and use of external props and devices in particular physical environments. The environment is not simply that space in which we gather inputs to think about or display the outputs (resulting actions) of internal cognitive processes. Instead, aspects of the world serve as things to think with, such that bodily manipulations of artifacts and aspects of the built environment are not fully formed cognitive outputs, but rather intermediate stages in a still unfolding cognitive process that occurs in a problem solving space that involves neural, bodily, and environmental elements.

Hyper-Individualistic, Brainbound Persons

The conception of human persons as dependent and situated, both amidst material and social structures, is a strong contrast to the prevalent view of human persons as self-sufficient individuals whose *considerable* powers of thought reside exclusively in the brain. The assumption that we are self-sufficient individuals has already been thoroughly discussed in philosophy (Sandel 1998; Benhabib 1987; Schott 1988; Taylor 1989), and, accordingly, I will only sketch the outlines of this atomistic conception of human persons in order to make some points about the human relationship with objects and corresponding ethical responsibilities.

Of course, where feminist philosophers have done important work to reveal the fact and significance of human dependency in the context of philosophy, they have also mounted trenchant criticisms of the atomistic conception of the human subject that occupies positions of privilege in moral and political philosophy and epistemology. Lorraine Code (1991) offers a summary snapshot of this character that is glimpsed at various times and texts in philosophy and culture:

> Autonomous man is—and should be—self-sufficient, independent, and self-reliant, a self-realizing individual who directs his efforts toward maximizing his personal gains. His independence is under constant threat from other (equally self-serving) individuals: hence he devises rules to protect himself from intrusion…In short, there has been a gradual alignment of autonomy with individualism. (77-78)

As Code (1991, 78) herself indicates, we encounter this conception of human persons in varying degrees in the social contract theorists of the seventeenth century. Perhaps most explicitly in Thomas Hobbes, who in describing the state of natural man, said, "Let us return again to the state of nature, and consider men as if but even now sprung out of the earth, and suddainly (like Mushromes) come to full maturity without all kind of engagement to each other…" (1651, VIII.1). C.B. Macpherson (1962) calls the conception of human persons in seventeenth century social contract theorists "possessive individualism," whereby the individual subject is characterized by freedom from dependence on the wills of others and is essentially a proprietor of his person and capacities in a competitive and possessive market society wherein he exchanges labor and products for self-preservation and power (263-266). Macpherson (1962) links this conception of the individual with a transition from a customary/traditional society in which individuals and groups were authoritatively assigned/allotted work in hierarchical fashion that reflected an objective and rigid order in the world, and in which property was a function of the community or state, to a possessive market society in which there is no longer any authoritative allocation of work based on an objective hierarchy, but instead only a free and competitive marketplace in which individuals are reduced to possessors of various goods, skills, and most fundamentally labor that they can sell to one another. While individuals vary in the amount of material resources they possess, all individuals have a certain bodily capacity for labor that they can sell, and thus their own projects for self-preservation and satisfaction are put firmly in their own hands and set at odds with others who would either endanger their lives or access to various goods.[21] Besides the way in which this conception of human persons establishes people as fundamentally independent possessors, it also reveals a human subject that is positioned as an administrator over his estate, which includes land, artifacts, and his body as a laboring tool. The administrator is a locus of thinking, planning, setting goals, and making decisions and, thereafter, mobilizes needed resources in a competitive marketplace to carry out plans and achieve various pragmatic goals.

Charles Taylor (1989) notes a similar trend in his account of the punctual self. Beginning with Descartes who finds the essential human subject through radical disengagement from the world and intensifying in Locke’s account of human

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[21] Though of course this idealization of the marketplace overlooks the fact that not all human persons (such as some physically and cognitively impaired individuals) have bodily capacities for labor that they can sell in the marketplace.

consciousness, the self becomes an extensionless power to "objectify and remake, and by this act to distance oneself from all the particular features which are the objects of potential change" (Taylor 1989, 171). Where before objective authority and orders of being in the world might have properly fixed an individual's understanding—no longer. Taylor (1989, 167-168) quotes Locke:

> For I think we may as rationally hope to see with other Mens Eyes, as to know by other Mens Understandings. So much as we ourselves consider and comprehend of Truth and Reason, so much we possess of real and true Knowledge. The floating of other Mens Opinions in our brains makes us not a jot more knowing, though they happen to be true. What in them was Science, is in us but Opinatrety, whilst we give up our assent to reverend Names, and do not as they did, employ our Reason to understand those Truths…"

As Taylor (1989) glosses this point, Locke is going further than the longstanding advice to investigate the reality of things for oneself instead of believing something unthinkingly. Instead he is committed to a conception of reasoning that is profoundly first personal and self-reflexive, taking place in a disengaged space that excludes any authority beside oneself (Taylor 1989, 167). As Descartes at the beginning of the *Meditations* writes, "Accordingly I have today freed my mind of all cares, secured for myself a period of leisurely tranquility, and am withdrawing into solitude" (1993, 13). The distinctive (and esteemed) human capacity to know is attributed to a subject that is able to disengage and isolate herself from the work of other persons, and who brings a ready reserve of reasoning power to bear on the world. A strong binary between robust reasoning and the world opens up.

This radically disengaged subject/self finds further expression in aspects of Sartre's existentialism. According to Sartre's version of existentialism, the self is forged through a free/independent project of perpetual self-creation. As Sartre gives voice to the existential self:

> I emerge alone and in anguish confronting the unique and original project which constitutes my being; all the barriers, all the guard rails collapse, nihilated by the consciousness of my freedom. I do not have nor can I have recourse to any value against the fact that it is I who sustain values in being. Nothing can insure me against myself, cut off from the world and from my essence by this nothingness which I am. I have to realize the meaning of the world and of my essence; I make my decision concerning them—without justification and without excuse. (Sartre 1984, 77-78)

As Pierre Bourdieu (1990) interprets Sartre, the Sartrean existential subject does not merely imitate the disengagement of Descartes, as a human being, but rather aspires to be Descartes' God, "whose freedom is limited only by a free decision" (43). Elsewhere Bourdieu notes, "refusing to recognize anything resembling durable dispositions or probable eventualities, Sartre makes each action a kind of antecedent-less confrontation between the subject and the world" (42). Bourdieu (1990) establishes a contrast between his own account of the human subject who is shaped by a habitus—a received and embodied history that establishes practical dispositions and behaviors as ways of being in particular communities and material environments— and the Sartrean subject, who appears unencumbered by any kind of embodied history that has been transmitted and practiced through the thick everyday structures of other human persons, traditions, specific environments, and material artifacts.[22]

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[22] Sartre is an expansive and complex thinker. While there is certainly some evidence in Sartre's work to confirm Bourdieu's interpretation of Sartre, there are other places in which Sartre admits more room for the world and other people to weigh more heavily on the free thinking and embodied subject. For example, Sartre talks at length about the nature of bodily experience as a basic structure of our perception of the world. He writes, "My body is everywhere: the bomb which destroys my house also damages my body insofar as the house was already an indication of my body" (Sartre 1984, 428). Therefore, instead of a
Footnote continues on the next page.

Even those in philosophy that seem to acknowledge the ways in which cognition might be extended or embedded in the extraorganismic world through artifacts, nonetheless argue that cognition or reasoning *should* take place predominantly or exclusively in the brain. Most famously in Plato's *Phaedrus*, Socrates uses the story of Theuth and Thamus to convey the inadequacy of writing as a form of remembering. Theuth, the god of writing, tries to convince Thamus, the king, to spread writing throughout his kingdom, saying "…here [writing] is something that will make the Egyptians wiser and will improve their memory" (274e). Thamus responds,

> In fact, it [writing] will introduce forgetfulness into the soul of those who learn it: they will not practice using their memory because they will put their trust in writing, which is external and depends on signs that belong to others, instead of trying to *remember from the inside*, completely on their own. You have not discovered a potion for remembering, but for reminding; you provide your students with the appearance of wisdom, not with its reality. (275, italics my emphasis)

Remembering from the inside (apart from the world of things) is privileged as the most authentic or truest form of remembering and the only sure path to actual wisdom in contrast to using writing as an external memory system. Eric Fromm (1976) echoes a similar sentiment in a more contemporary context, he writes:

> The way those in the having mode remember a face or scenery is typified by the way most people look at a photograph. The photograph serves only as an aid to their memory in identifying a person or a scene, and the usual reaction it elicits is: "Yes, that's him"; or "Yes, I've been there." The photograph becomes for most people, an *alienated* memory…Memory entrusted to paper is another form of alienated remembering… Considering the multitude of data that people in our contemporary society need to remember, a certain amount of notemaking and information

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fundamental critique of Sartre's project, Bourdieu's criticisms are best understood as a call for consistency on Sartre's part in how he represents the free human subject.

> deposited in books is unavoidable. But the tendency away from remembering is growing beyond all sensible proportions. (27)

Here again, even when external, material structures such as pictures or writing are recognized as constituting or assisting the memory process, it is only an alienated form of memory/remembering, suggesting that it is deficient in respect to that form of remembering from the inside, within the neural matter of the biological brain.

What is especially important about Fromm's and Plato's accounts is the underlying assumption that individuals can get along perfectly well with remembering and other cognitive/reasoning powers without utilizing external material structures. Even more, individuals can *thrive*, that is, they can remember and think more truly without external material structures. The interior space, which seems to be framed with reference to the dividing line of the human body, is hallowed as the truest and surest space for human thought. Like the Sartrean existential self, and the punctual self and possessive individual before it, the thinking self exists independently of other persons and is cognitively unencumbered by material structures and specific environments. In short, the conception of human persons that is glimpsed in various times and places throughout philosophy is that of a curiously interior thinking thing that is *not* enmeshed within particular spaces and places or dependent on other persons.

However, such a conception of human persons fails to intersect with the everyday, lived experience of human beings who find themselves at various times and places during their lives to be deeply enmeshed within material and social structures. Whether or not cognition is ultimately decided to be extended, embedded or some other variant of situated cognition, the fact remains that when we look around us, we do not see people constantly turning inwards to engage in cognitive processing removed from other persons and artifacts or the built environment, instead we see human beings that are bound up in both pragmatic and epistemic relationships with artifacts, the built environment, and other persons.

Of course, Plato or Fromm might still claim that, even if human beings typically are dependent and situated, they actually *should* be more clearly defined individuals committed to exclusively brainbound forms of cognitive processing. This claim is problematic, though, because it assumes that human beings are always capable of a kind of rugged individualism and strictly brainbound processing. However, as I have tried to show in this chapter, this is not always the case. When we take into account the entire human lifespan, then we more clearly see periods of our life when we are properly dependent on the support and care of other persons as well as the material environment for realizing aspects of cognitive processing (e.g. during childhood or periods of sickness and injury).

Even apart, though, from whether we are always able to choose to pursue a more individualistic lifestyle or strictly internal cognitive processing, it simply is not clear that we engage in better or truer forms of thought when we rely only on our neural resources and ourselves alone. Instead, the evidence indicates just the opposite. Human thought flourishes when we utilize artifacts or the built environment to realize aspects of cognitive processing. Some of the greatest mathematical and scientific achievements of the past several hundred years would not have been possible were it not for the fact that scientists and mathematicians were able to scaffold some of their thought processes onto paper or computer and manipulate culturally established numbers, symbols, and words to perform complex calculations and reasoning processes that are difficult or impossible through strictly internal manipulation of mental representations.[23] Similarly, philosophers have developed tremendously subtle and precise arguments about a range of philosophical issues through the ability to iteratively interact with text in a word processing program and fluidly revise some aspects of the argument while holding others steady and even preserving, as a form of memory, successive versions and drafts of the argument. Even an individual like Socrates should be able to glimpse the force of this insight by reflecting on his own use of conversation with other persons to dialectically develop sophisticated arguments, wherein certain interlocutors might continue to repeat and hold steady an aspect of the argument while others revise some aspect until, gradually, a more settled set of premises and conclusions results.

Variously, forms of situated cognition enable individuals to engage in more complex forms of thought, and/or thought that is faster and/or prone to less error. It remains, then, for critics of this position to more persuasively make the case for why human beings should refuse the advantages of epistemic material scaffolding and instead resolve to utilize strictly brainbound forms of thought. As it stands now, though, there are good reasons to think that being a dependent and situated thinking creature is part of the human condition and that we are often well served by our relationships of dependence, interdependence, and situatedness amidst social and material structures.

[23] Gallagher (2013) defends a liberal account of extended cognition that not only includes artifacts, but also institutions such as the legal system. If we include institutions such as the legal system, then we can see that with the tremendous developments in the modern US legal system over the past several hundred years there has also been immense growth in human thought as well.

CHAPTER 4

REPAIRING DEPENDENT AND SITUATED PERSONS

> To be rooted is perhaps the most important and least recognized need of the human soul. It is one of the hardest to define. A human being has roots by virtue of his real, active and natural participation in the life of a community which preserves in living shape certain particular treasures of the past and certain particular expectations for the future.
>
> -Simone Weil (|1949| 2002*, 43)*

Introduction

The task of the previous chapter was to set forth two conceptions of human persons and to make the case that there are good philosophical and empirical reasons to think that human persons are best understood as dependent and situated thinking creatures. This chapter now begins the work of offering an ethical analysis that is responsive to the peculiar forms of harm and wrongdoing that afflicts persons who are understood as dependent and situated as opposed to hyper-individualistic, brainbound thinking creatures. In particular, I focus on how each conception of human persons has important implications for how we understand the significance of the objects and built environments in individuals' lives, and thus our moral responses as friends, family, strangers, and as a society when damage to material possessions in various spaces and places occurs (e.g. during a hurricane, a home invasion, or an accidental misplacement of some object). Drawing on work in Chapter 2 regarding the distinction between repair and mere replacement, I argue that a commitment to engage in repair corresponds with that of persons as dependent, situated thinking creatures, while a commitment to replacement more adequately matches a picture of persons as hyper-individualistic, brainbound thinking creatures. Therefore, to the extent that persons are more accurately understood as dependent, situated thinking creatures, repair picks out the more specific ethical responsibility in certain circumstances. In order to make sense of the repair of dependent and situated human thinking creatures, I introduce and develop a more specific account of repair that I term "cognitive-agentic repair." This account of cognitive-agentic repair then sets the foundation for Chapter 5 in which I make the case that our prima facie responsibility to engage in cognitive-agentic repair requires that we utilize cognitive-agentic repair as a standard by which to design, implement, and select those technologies that will need to be repaired and will be used for repair in the everyday spaces and places in which human beings are enmeshed.[1]

The Relationship To and Use of Objects and Spaces

To begin, I consider how persons understood under each conception of human persons relate to artifacts and the built environment. It is not likely that any of those thinkers advancing or assuming a conception of hyper-individualistic and brainbound persons imagine human persons entirely apart from the world of artifacts and particular spaces and places. Even Descartes, who is often charged with inaugurating a curious philosophical trend towards disengagement from the world, nonetheless signals at the beginning of the *Meditations* that he is sitting next to a fire, wearing his winter dressing gown, and holding a sheet of paper in his hands (1993, 14). That is, the world of objects

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[1] Here and elsewhere I use the term "enmeshed" to indicate the tight form of dynamic interaction (characterized by feed-back and feed-forward loops) between embodied persons and their material environment that serves to realize thought and deliberation processes.

is still real and relevant for a hyper-individualistic, brainbound thinker. But the relationship with those objects is construed as fundamentally pragmatic. That is, various objects and structures—the fireplace, a winter dressing gown, a piece of paper—enable the individual to achieve certain pragmatic uses and goals (e.g. generating heat, keeping the body warm, kindling for the fire, establishing a secure and safe space, even providing things to think about as in the case of the wax candle), which may range from the trivial to the deeply important. As Macpherson (1962) makes clear in his analysis of possessive individuals inside of the social contract tradition, property is a vital means to preserving one's life and achieving various goods (honor, pleasure, etc.) in a competitive marketplace where your property (including your own laboring body) are at risk of being co-opted in another individual's pursuit of more power. But importantly, a binary exists, such that the free, personal reasoning process (cogito) that assigns material possessions to various ends to achieve episodic and programmatic goals (self-preservation, honor, pleasure) exists, fully formed, in advance and independent of the material possessions themselves; thought is a complete power that is brought to bear on the objects and structures.

On closer examination, this reasoning process that not only reflects on various choices and plans but also wills certain ends for itself (namely, lives a life) is not merely a reasoning process, but is the autonomous (freely, self-governing/self-determining) subject of moral and political philosophy, at least in its most general form. As Marilyn Friedman puts it, "Roughly and generally speaking, an autonomous person behaves and lives her life in accordance with values and commitments that are, in some important sense, her own" (2000, 212). More accurately then, the autonomous subject that is able to think, reflect, and plan for a whole range of episodic (daily) and programmatic (lifetime) goals and endeavors exists, fully formed, in advance and independent of the material possessions themselves; the autonomous subject approaches objects and structures and assigns them tasks to fulfill. Descartes, as a self-governing subject, resolved to undergo extensive and sustained self-reflection to discover the sure foundations of knowledge. To realize his goal, he then sought to ensure that he had access to a tranquil place of solitude that was also presumably warm and comfortable, and thereby arranged himself alone in a room, next to the fire place, and in his winter dressing gown. The objects and structures of Descartes' material environment are pushed, pulled, arranged, and re-arranged relative to certain practical purposes that enabled him to achieve his higher order, autonomously chosen goal of undergoing a period of sustained self-reflection to discover the true foundations of knowledge. In short, the autonomous, individualistic, brainbound subject exists alongside and pragmatically uses the world of objects but is not *enmeshed* within the world of objects.

While dependent and situated persons also relate to material objects and structures pragmatically, their relationship with particular objects and structures is intensified through the application of epistemic purposes as well. Kirsh and Maglio (1994) provide a useful distinction and analysis of pragmatic versus epistemic actions/purposes. Pragmatic actions are "those actions whose primary function is to bring the agent closer to his or her physical goal" (Kirsh and Maglio 1994, 515). Thus, if Susan plans to vacation in France for the summer, she will engage in a series of pragmatic actions (purchasing a plane ticket, converting currency, arranging for lodging) that bring her closer to her overall goal (vacationing in France). By contrast, "epistemic actions—physical actions that make mental computation easier, faster, or more reliable—are external actions that an agent performs to change his or her computational state" (Kirsh and Maglio 1994, 514). According to Kirsh and Maglio (1994, 514), epistemic actions have the value of:

1. Reducing the memory involved in mental computation (space complexity)
2. Reducing the number of steps involved in mental computation (time complexity)
3. Reducing the probability of error of mental computation (unreliability)

For example, when playing Scrabble, instead of rearranging the available tiles in their head, players will often physically re-arrange the tiles in the game space in order to explore possible combinations (Kirsh 1995).

Relatedly, we can imagine a young graduate student working on writing his dissertation at his computer. While at first the graduate student tries to sit quietly and arrange various ideas, distinctions, sources, and qualifications in his head, the memory, imagination, and reasoning costs to do this consistently, quickly, and well become too much, and he then begins to scaffold some of the information processing that he was trying to do in his head onto a word processor on the computer screen.[2] As he types an

[2] Interestingly, Descartes may have experienced a similar situation. As already noted, at the beginning of the *Meditations* Descartes begins his period of radical self-reflection by arranging himself beside the fireplace and in his evening dressing gown and with a piece of paper in his hand. There is a kind of gestalt shift effect that can occur in how we perceive/imagine this scene. The paper in Descartes' hand might be used for the very practical purpose of kindling for the fire or, struggling to keep all the aspects of his self-reflections in view while continuing to refine and develop new thoughts, Descartes may have begun to write words, phrases, sentences on the paper, scratching some out, inserting others into place and gradually schematizing the statements in the form of an argument on the paper. The latter situation resembles the behavior of a thinking creature engaged in embedded or extended cognition processes.

outline of his arguments, he is able to re-read previous aspects of the argument while imagining and reasoning through new possibilities, and he now no longer needs to play with possibilities in his head, but, rather, can type out various statements and gradually rearrange, add, or delete one word, several words, or whole sentences and paragraphs. Meanwhile, at his desk, he no longer tries to keep all of the various references to be cited in his internal biological memory, but, instead, has physically arranged books in sequence of how he would like to cite them in the section of the argument that he is working on. For this young graduate student, the desk space and computer not only allow him to carry out certain pragmatic actions (propping up the computer and books, buying books online, maintaining communication with family and friends), but also facilitates a range of epistemic actions that are intended to enable and/or improve forms of cognitive processing, much like Edwin Hutchins (1995) description of the cognitive work to be done in the commercial airline cockpit. For the dependent and situated person, these epistemic cockpits, so to speak, and the constitutive material artifacts therein are likely to be found throughout everyday life (in the kitchen, at the office, in the car, in the family room, or are even made portable by carrying a purse or backpack with certain consistent items—a phone, a calendar, a notepad, a journal).

Epistemic actions are important because they blunt or remove the binary of thinking/reasoning and the material world. Thought/reasoning is not simply a complete power in reserve that is variously brought to bear on the world. Instead, thought and reasoning frequently develops iteratively through ongoing interactions between embodied persons and material artifacts in often familiar and structured environments.

But it is not merely thought and reasoning processes that are situated in the world. The work of autonomous deliberation can also be seen as distributed over brain, body, and world.[3] Sometimes personal autonomy is construed as simply the ability to make competent decisions for one's self free from coercive elements. However, in the vagueness of such a definition, we are likely to put the emphasis on the resulting decisions and miss the fact that autonomy depends on a prior reasoning *process* that develops iteratively through consideration of different aspects or possible aspects of one's identity (cares, commitments, convictions, hopes, dreams) and various experienced, remembered, or imagined situations in the world.

Diana Meyers (1989, 2004) offers an account of personal autonomy that puts the proper accent on the process of self-deliberation that results in autonomous decisions. Meyers (2004) describes personal autonomy as the ability to exercise control over one's life through programmatic decision-making (e.g. How do I want to live my life?) and episodic decision-making (e.g. What do I really want to do now?). But to answer these questions authentically, conscious of the quartet of threats to making free and intentional plans for one's self (namely social pressure, externally applied coercion, internalized cultural imperatives, and individual pathology), requires a repertoire of more or less practiced skills that enable a comprehensive survey and analysis of options; self scrutiny of feelings, values, goals, etc.; and the ability to act on these reflections (Meyers 1989, 2004). This repertoire of skills (what Meyers calls "agentic skills") involves,

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[3] Mason Cash (2010) has also made this connection between accounts of extended cognition and personal autonomy. Similar to my account, he sees accounts of personal autonomy such as Meyers (2004) and Friedman (2000) as being particularly amenable to being expressed in terms of extended or embedded cognition.

introspection skills, communication and listening skills, memory skills, imagination skills, analytical and reasoning skills, self-nurturing skills, volition skills, and interpersonal skills (see Meyers 1989, 76-91; 2004, 10, 13-48). These skills constitute an individual's overall autonomy competency, which may vary with respect to time, situation, or the issue under consideration.

Thus, individuals are not strictly autonomous or not autonomous, but rather more or less autonomous based on the deployment of the various agentic skills that enable the complex work of self-definition, self-development, and self-direction. In contrast to individuals who are heteronomous, Meyers (1989, 205-206) suggests that individuals are minimally autonomous when they are adept enough in some agentic skills to identify at least a small set of integral values, emotional bonds, and personal interests so as to govern their episodic and programmatic decision-making. But in contrast to medially autonomous individuals, who are more practiced in their deployment of the range of agentic skills, minimally autonomous individuals often exhibit cruder self-probing, shakier commitments to personal standards and desires, and lack broader and more comprehensive life plans (Meyers 1989, 205-206).

By attending to the more fine-grained analysis of skills necessary to carry out autonomous decision-making, we are positioned to see its cognitive underpinnings. That is, given the traditional treatment of remembering, perceiving, and reasoning as cognitive processes, it becomes clear that Meyers' list of agentic skills either refer explicitly to cognitive processes (memory skills, analytic and reasoning skills) or the agentic skills (e.g. introspection skills, imagination skills, etc.) consist of various cognitive processes (remembering, reasoning, etc.). This constitutive relationship between various cognitive processes and agentic skills allows us to see more clearly that the way in which cognitive processes are realized will give a distinctive appearance and form to the more general process of autonomous decision-making. That is, any given individual's capacity for and performance of personal autonomy consists in a range of agentic skills, which, in turn, either are or further consist in a series of cognitive processes. The underlying processes of cognition shape the overall capacity for and performance of personal autonomy (see Figure 1 below).

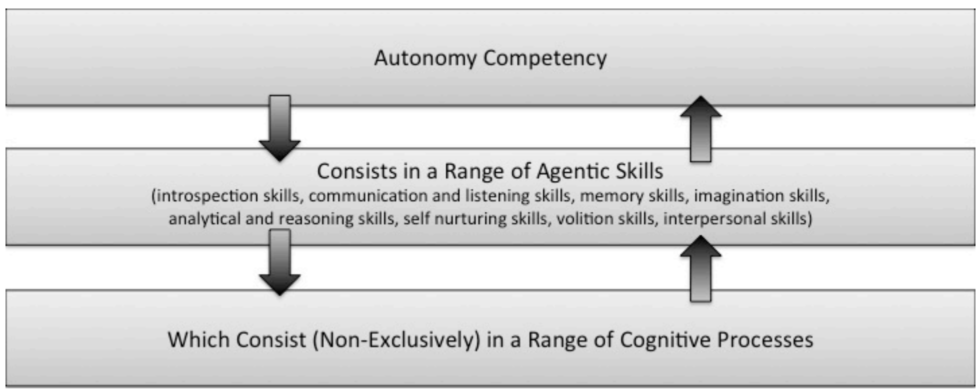

Figure 1. The Relationship Between Meyers' Account of Autonomy Competency and Cognitive Processes

In turn, to recognize the occurrence and process of autonomous decision-making will require epistemic sensitivity to the ways in which cognitive processes can be and often are (though not always) extended or embedded in objects and the built environment. Where and when cognitive processes and agentic skills are realized by the ongoing interactions between an embodied individual and her environment or objects therein, autonomous deliberation is also properly recognized as occurring over the space of brain, body, and world. Importantly, it follows that, just as cognition is not always extended or embedded amidst technologies, autonomous deliberation is not always extended or embedded amidst technologies.

Nonetheless, when cognitive processes are situated amidst technologies and environments and are constitutive of agentic skills that realize more general autonomy competency, the autonomous subject does not (at least not always) exist merely alongside the world of objects, but is more accurately recognized as sometimes being enmeshed within the world of objects. Interactions with objects and environments are not merely expressions and effects (outputs) of autonomous decisions about how to live in the world. Instead, interactions with objects amidst various environments are, more foundationally, sometimes the integral means of developing and making decisions about one's commitments, hope, goals, aspirations (namely characteristic or identifying features of a human personality) and planning episodic (daily) and programmatic (lifetime) projects that express, develop, refine, and realize identifying features of our personalities in the world with others (namely achieving some measure of personal autonomy). In contrast to the possessive individual, who mobilizes various forms of property to bring about certain goods for himself, the situated autonomous subject first utilizes material objects and structures to discern and define various goods for herself as an autonomous individual, after which additional material objects and structures are recruited to achieve the determined goods.

At this point, though, the objection might be raised that moving from accounts of embedded and extended cognition to regarding the various aspects of autonomous decision making as situated is an unjustified leap. The critic might argue that if you look more closely at the kinds of examples cited in the embedded/extended cognition literature, you will see that they are primarily instances of cognition in which features of the body and environment are recruited for cognitive processing that is directed at a present situation or task (e.g. the Tetris player engaged in a current game of Tetris), which often involve time pressures that incentivize utilizing material objects and structures in order to improve efficiency. However, other instances in which cognitive processes are directed towards some past or future situation or task that is not presently engaged (e.g. planning for a vacation next year, dreaming about mountain biking later in the afternoon, or deciding whether to attend graduate school next year) and are less constrained by immediate time pressures are much more clearly the province of internal mental representations in the brain.[4] As Grush puts it, “The brain can silently contemplate, dream, plan, all as a matter of a play of representations—pretty much everything Descartes thought the mind could do even in the absence of the world” (2003, 87; originally cited in Clark 2008a, 154). Likewise, remembering; planning; dreaming about who one has been, is, or wants to be; assessing personal convictions and commitments; setting goals; and planning actions that express or realize abiding aspects of who one takes oneself to be need not be regarded as situated/embedded/extended in the material environment, but are likely properly assigned to the internal play of mental representations in the brain outside of time pressures imposed by some present situation or task.

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[4] Clark (2008a) considers a similar objection to his account of extended cognition though he does not consider issues of personal autonomy, which I introduce here.

Although it is undoubtedly true that instances of cognition that target some past or future situation or state can and do occur sometimes exclusively in the brain through the use of fully formed mental representations, this need not always be the case. Neither is there anything in principle that would keep material objects or structures from sometimes acting in lieu of or otherwise augmenting internal mental representations for the purposes of thinking about some future or past situation or state. For example, Clark (2008a, 154; 2008b) notes the general class of surrogate situations in which an individual might utilize some material object or structure that is used to “stand in or take the place of an aspect of some target situation.” Thus, an architect designing a not-yet existent bridge might use a simplified drawing or physical model in order to explore possible configurations and orientations for the future bridge. Similarly, we can imagine an individual considering a major alteration to an identifying personal feature (e.g. a sex change, leaving a spouse, changing occupations, or retiring) and utilizing some kind of virtual simulation such as an avatar and online world in which to consider and evaluate aspects of the future target situation.

As Clark emphasizes, the surrogate situations need not be precisely miniature versions of the target situation (such as in the case of the avatar simulation), but may be more specific in allowing a person to engage with a particular aspect of the target situation (e.g. the affective dimension of a past action). For instance, Marya Schechtman (2001, 2007) talks about using a series of pictures in order to evoke certain past emotions involved in a particular action and then to assess the degree to which the present version of one's self identifies with the past self's affective state and orientation to the past action under consideration.

Nor is the use of these surrogate situations merely equivalent to the exclusively internal play of mental representations, such that an individual might just as easily choose one method over the other. Instead, the surrogate situation may allow the individual to get a better grip on the target situation, and hold it more firmly in view to thoroughly consider all the aspects or just those aspects that are especially relevant (Clark 2008a, 155). As a result, the deliberation about the target situation may be more systematic, careful, complete, and/or faster, and possibly even lead to different conclusions than that of purely internal mental representation manipulation. Moreover, to the extent that we sometimes need to deploy multiple surrogate situations in order to adequately address a complex target situation, the use of material objects and structures can serve as an external memory store that simplifies an otherwise complex, internal memory task and may possibly minimize the tendency to forget or overlook some information. This suggests that there might actually be an advantage in selecting material objects and structures to sometimes carry out cognitive processing aimed at past or future situations that are relevant to self-deliberation about the kind of person one has been, is, and wants to be.

Moreover, it is a mistake to assume that the deliberations involved in enacting personal autonomy are always conducted from the proverbial armchair in the quiet office space, removed from the pressures of the day-to-day world. Sudden and unexpected situations certainly arise, which force the *clarification* (not necessarily invention or wholesale revision) of commitments and values and other identifying features of our personalities. In these situations, planning, imagining, and remembering may need to occur quickly, and thus the time pressure of the situation favors an individual utilizing material objects and structures in order to more capably and efficiently carry out the deliberation.

The previous two paragraphs make the important observation that while autonomous deliberation can occur sometimes entirely in the head, there are advantages to situating autonomous deliberation in the extraorganismic world. For example, just as extended/embedded cognitive processes sometimes allow for faster, more accurate, and/or more comprehensive processing, so also situated autonomous decision-making might allow the process of autonomous deliberation to occur more quickly, more accurately, or more comprehensively. These advantages would allow an individual in specific situations to more readily, more reliably, and/or more completely determine, express, and enact his decisions about how to live his life. In short, situated autonomous decision-making can allow an individual to make decisions that are *more* autonomous (given that personal autonomy is not an all or nothing affair on Meyers' (1989, 2004) approach). Though situated autonomous deliberation is not necessarily required to make at least a minimally autonomous decision (whereby at least a small set of personal values and interests are determined and brought to bear on deciding what one really wants to do now and in the future).

An exception would be cases in which an individual's biological cognitive processing capabilities are severely compromised (for example by Alzheimer's disease), and extraorganismic technologies are required to carry out compensating forms of cognitive processing. In those cases, it may be that situated autonomous deliberations are actually necessary to even achieve an autonomous decision about what one really wants to do. For example, personal autonomous deliberation involves asking the question: What do I really want to do right now? But to answer this question requires some understanding of the "I" who is engaged in the inquiry, and thus entails questions of who I am and who I have been. However, if an individual's biological memory processing capabilities are severely diminished, then finding an answer to "Who have I been?" may be extremely difficult if not impossible. But this need not rule out all possibility of autonomous decision-making. Instead, technologies such as a memory notebook, can compensate for diminished biological functions, and provide meaningful answers to the question "Who have I been?" and therefore facilitate a certain measure of autonomous decision-making (regarding memory books, see Schmitter-Edgecombe et al. 1995; Uchida et al. 2007; McKerracher, Powell, and Oyebode 2005; Sohlberg and Mateer 1989).

Another exception would be an individual who is not affected by any kind of neurological disease, but instead, for any number of reasons, has routinely chosen to scaffold thought processes amidst her technologies and built environments instead of using strictly internal mental resources. As a result, when it comes to thinking and especially deploying various agentic skills (analysis and reasoning, imagination, memory, etc.) for the purposes of self-reflection and autonomous decision-making, she is considerably more practiced and competent with various extraorganismic technologies, and may even struggle when not using particular technologies. In this case, to mobilize enough practiced agentic skills for the purposes of meaningful self-discovery and self-definition will require the use of various technologies. Situated or autonomous deliberation and decision-making in this case would then be necessary for achieving at least a minimally autonomous decision.

Importantly, though, just as internal thought processes must be scrutinized for undue social pressures (among other things) that might compromise or diminish the extent to which an individual's decision is actually an expression of what he really wants to do, situated cognitive processes and deliberations also need to be scrutinized for undue social pressures that might be conveyed through the technologies themselves along with more direct forms of coercion as well.[5] For example, social networking technologies can be useful tools that allow us to think constructively about aspect of ourselves. However, a social networking tool, such as Facebook, is not a blank canvas on which to think about ourselves. Instead, certain technological design decisions have been made in putting together that technology that shape and constrain the nature and quantity information individuals can inscribe on the technology and accordingly what aspects of themselves they can explore and reflect on. Moreover, Facebook makes extensive use of advertising on its website that is often augmented by endorsements from other people that an individual knows on the social networking site. Self-reflection on a social-networking

[5] Christopher Nolan's film, *Memento* (2000), explores this issue in fascinating ways through the imagined case of Leonard who is unable to form new long term memories, and compensates for this by tattooing important information on his body. However, as it gradually becomes clear in the film, other individual's who know how Leonard works, use this information to influence the content of Leonard's tattoos and accordingly manipulate his decision-making and subsequent actions.

site, such as Facebook, does not happen in any kind of pure space removed from social pressures, but instead, certain kinds of social pressure in the form of advertising are a vivid part of the use of that technology. These social pressures need to be accounted for in order for the processes of self-discovery and self-definition facilitated by the technology to be considered genuinely autonomous.[6] But neither is this a problem for situated cognitive processes and distributed autonomous deliberations alone. Pernicious advertising messages (as well as other forms of undue social pressure or direct coercion) that impede an individual from discerning what she really wants to do with her life or in a particular situation are also easily internalized and can shape and constrain internal self-reflections as well. Nonetheless, the important point remains that, while situated cognitive processes may be advantageous to autonomous deliberation and decision-making, and may even be necessary at times to achieve a measure of personal autonomy, they are not sufficient for ensuring an autonomous decision.

Agentic Skills Amidst Artifacts and Places

Below are some specific and striking examples of how autonomous deliberation in pursuit of self-definition, self-development, and self-direction might be understood as situated amidst embodied persons and their material environments/artifacts. For my purposes here, I focus only on the agentic skills of memory, imagination, volition, and

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[6] Gallagher (2013) and Selinger and Engstrom (2008) have rightly pointed to the need for a critical turn, so to speak, with respect to models of extended/embedded cognition. That is, beyond simply explaining how and to what extent various technologies and possibly persons and institutions can extend/embed cognitive processing in the extraorganismic world, we should also critically evaluate the social and political dynamics interlaced with the technologies that we interface with. In fact, philosophers of technology (e.g. Albert Borgmann [1984], Andrew Feenberg [1999], and Langdon Winner[1986]) offer excellent analyses of some of the social and political dynamics bound up in certain patterns of technology. It then remains to draw more work on situated cognition into dialogue with work in the philosophy of technology.

analysis and reasoning, which offer some of the clearest instances of situated thought processes. This will be sufficient to convey the ways in which dependent and situated thinking creatures engage in and carry out autonomous deliberation through interaction with artifacts and environments. It is worth noting, though, that while Meyers presents each agentic skill as distinct, and accordingly I treat them separately here as well, when we attend to the extension of cognitive processing and agentic skills amidst artifacts, the agentic skills begin to interlace with one another. That is, the practices surrounding the use of one object (such as a photo album) may not be exclusively about memory skills, but could also involve self-nurturing skills; the blogger who enacts analytical and reasoning skills about herself through a public blog might also be engaged in the practice of valuable communication skills as well. By attending to the material basis of cognitive processes and agentic skills we then see the variety of ways in which agentic skills are deeply interconnected as they are mobilized to achieve a certain measure of autonomy competency in life.

Memory Skills

Memory is a common focus in accounts of situated cognition because the examples of scaffolding aspects of our memories in our artifacts and the extraorganismic environment are abundant. Besides being a form of cognitive processing, remembering is also an agentic skill that is important for the practice of personal autonomy. Our memories about formative events in our lives, past decisions, resolutions, hopes, and goals serves both as a resource for continuing to make sense of who we are and what we care about and as a foundation on which to determine what it is we really want to do now and in the future. As such, when thinking about how the practice of personal autonomy is situated, it is clearest to consider how the memory of important/formative life events, decisions, resolutions, hopes, desires, goals, and convictions might be enmeshed wholly or partially in our lived environments.

For example, an individual might use photos and/or audio or video recordings to remember an event or experience in a specific manner so as to elicit and evaluate affective responses to the memory in order to assess the degree to which the present self/subject is able to identify with the hopes, aspirations, goals, and convictions of a past version of the self/subject and discern the degree of self-narrative continuity between the past and present (Schechtman 2001, 2007; Robinson 2007). Like a mathematician manipulating numbers and symbols on paper, we can imagine individuals using particular sequences of photos or recordings in order to generate results that would be difficult to complete through strictly internal representations.

Clive Thompson (2013) has charted several cutting edge examples of individuals who are utilizing technologies to dramatically extend their ability to remember details of all that they have done in their life, which I recount in this and the next several paragraphs. Deb Roy (an MIT speech scientist) has created a system called Total Recall that is installed in his home and consists of video and audio recording devices that are nearly constantly recording every word and action that occurs in various parts of the house. The system works automatically and is always on unless manually turned off. On one occasion Roy's son took his first steps and the system caught the event on videotape. Roy was later able to revisit and explore the event again via extensive video and audio recording, and even discovered that his unaugmented biological memory of the event had misremembered certain significant details.

Gordon Bell wears a camera (SenseCam) around his neck throughout the day that takes a picture every sixty seconds, as well as an audio recording device to capture any conversations (Thompson 2013). This information is then stored on his computer, where he also maintains a record of every web-page he looks at, every email he sends and receives, and also recordings of all phone conversations. As a result, Bell has a stunningly searchable record of his daily life that he is able to treat as a kind of surrogate brain, whereby, when he cannot recall a particular detail, he simply searches his digital record of his life. While Bell might represent an extreme version of, as Thompson (2013) terms it, "lifelogging," we can see aspects of Bell's behaviors in many others as well. For instance, Google Gmail users are afforded a considerable amount of online storage for their email, such that it is unnecessary to delete anything. As a result, users can treat their email archive (much like a collection of handwritten letters) as a form of memory about past conversations and especially the various hopes, goals, convictions, commitments that might have been expressed therein. For example, Thompson (2013, 43) recounts a women named Sara "[who] had kept everything from racy emails traded with a married boss…to emails from former boyfriends; she would occasionally hunt them down and reread them, as a sort of self scrutiny." As Sara herself remarks, "I think I might have saved some of the painful emails because I wanted to show myself later, 'Wow was this guy a dick'" (Thompson 2013, 43).[7]

[7] Not only is the email technology serving to realize certain agentic memory functions for the woman
Footnote continues on the next page.

Besides the use of technologies to chronicle a life and act as externalized forms of memory, Thompson (2013) also notes the use of technologies to more actively engage with and compliment our biological memory capacities. For example, Bradley Rhodes developed a software program called Remembrance Agent that would automatically scan anything being written on his computer (an email, essay, notes, etc.) and then search through past emails and documents for related documents. So, for example, if he was asking a question in an email that he had already gotten an answer to in the past, the software agent would direct Rhodes to the archived document and its relevant answer. A similar kind of technology has now been implemented in the popular note-taking software called Evernote, such that when a user types or adds content to a note, the software will automatically display other notes along the bottom of the application window that have related content. The associative memory links that might have previously fired in the brain are now being augmented by associative links developed through sophisticated computer software.

Intriguingly, Eric Horvitz (an AI researcher at Microsoft) has developed a program called Life Browser that searches digital collections of a person's life (e.g. emails, photos, calendars) in an effort to highlight significant life events (Thompson 2013). The program works by first prompting the user to designate important or vivid memories in the digital collection, and then develops a pattern template to search the remaining digital files and offer suggestions. As Horvitz reports upon receiving the

named Sara, but it also enables a certain amount of externalized introspection. Instead of each agentic skill being scaffolded by a different technology, engagement with one technology can support and realize several agentic skills.

program's results for one month in his life in the previous year, "I would never have thought about this stuff myself, but as soon as I see it, I go 'Oh, right– this was important'" (Thompson 2013, 39). Horvitz and the computer work collaboratively to not only remember, but to remember especially important events that, amongst other things, will likely play a formative role in his understanding of who he is and wants to be; in short, his practice of personal autonomy.

But examples of situated memory need not be limited to cutting edge, sophisticated software programs. Instead, Miller (2008, 2010) has observed that everyday material objects might be utilized to sculpt memory processes after someone has died or gone away. This is distinct from cuing memory; instead, the object serves to structure the process of remembering so as to emphasize particular features of a person no longer present that are connected with the material object (e.g. a hammer, a fly fishing rod, a religious text, a dress or suit). Individuals may do this by selecting certain objects to retain and keep after someone has died, or individuals might actively pass on particular objects before or after their death in an effort to affect how they will be remembered (see Miller 2008, 2010). Sue Campbell (2004, 136) captures this insight well, "When my sister tells me that it would be hard to sell our family cabin because her memories are there, I do not take her to be speaking extravagantly or wholly figuratively. Buying the cabin was a way of structuring the significance of our family history to our present and future, a way of remembering it. It was as much as anything a memory activity."

Daniel Miller (2010) theorizes that based on this use of objects as an external way of controlling and shaping the memory process, the action of moving houses can actually be an important means of self-development and self-definition. As he puts it (Miller 2010, 97):

> Moving house allows for a kind of critical realignment of persons with their possessions. When moving house they discard some of their stuff but, in contrast to the house itself, many other possessions move with them. As such, moving house allows people to reconstruct their personal biography as represented in memories of associated objects and thereby the sense the family has of itself. Certain relationships with other people get discarded along with the objects that memorialized them, while others come to the fore and are used prominently in the decoration of the new home.

In this manner, an individual, couple, or family arrives at an understanding of identifying features of their personality/identity through the arrangement and re-arrangement of objects, which then also serves as a vital form of memory work by which they hold certain commitments, hopes, values, and relationships in view.

Imagination Skills

Nick Yee and Jeremy Bailenson (2006, 2009) have done empirical research showing that the use of avatar simulations in computer mediated virtual worlds can be valuable in helping individuals to imagine and consider the perspectives of other types of people (for instance an older person or a person of a different race). Outside of the laboratory setting, there is widespread use of avatars in online, virtual worlds such as Second Life and gaming virtual worlds such as World of Warcraft. The ability to extensively customize the avatar without any commitment to resembling one's own physical body offers the considerable ability to explore alternate representations of one's self. Social networks such as Facebook and Google Plus offer a similar kind of experience through the use of user profiles that express a crafted persona. The special advantage of doing this in a virtual world or a social network held in common with others is the ability to examine the reactions of other users to aspects of one's avatar personality and form. This can be seen as a kind of scaffolded capacity for imaginative counterfactual speculation in which alternate possibilities for one's self are considered, evaluated, relished, or repudiated.[8]

Instances of situated imagination need not be especially technological, either. The use of playroom toys undoubtedly offers a means of scaffolding aspects of the imagination such that portions of rich and expansive worlds and situations are seamlessly distributed between a child's internal imagination and the physical objects or structures that she is playing with. Such examples of imaginative play can be an important form of projecting and considering future possibilities for oneself (e.g. being a fireman, a soldier, a president, a chef).

Volitional Skills

Personal autonomy not only involves self-discovery and determining what one really wants to do, but also exercising volitional skills that enable an individual to put those desires into action. Volitional skills, such as self-control in the face of procrastination, are not merely a matter of brut willpower, but also sometimes involve cognitive tasks such as reframing the task by breaking it down into a series of smaller more manageable tasks or re-describing the task to be done in more appealing terms or in terms of something that is interesting or fun (Heath and Anderson 2010). However, as Heath and Anderson (2010) rightly point out, limited human beings do not always rely on

[8] Of course, by locating this form of imagination in a shared social world, there is potential for actions and appearances to be interpreted as deceptive depending on the understanding of how a virtual world works and what rules users are meant to abide by.

these overt, internal cognitive strategies to ensure self control and enact volitions. Instead, people recruit features of the extraorganismic environment to offload some of the work of internal cognition and brut willpower in order to exhibit better self-control. For example, Heath and Anderson (2010, 245) describe the act of placing running shoes in front of the coffee maker so as to trigger the intended running routine before sitting down to a cup of coffee, which might otherwise lead one to procrastinate running. Other environmental structures (what they call "chutes" and "ladders") either lower or raise the threshold for how difficult or unappealing an intended action or a distracting action appears to be (Heath and Anderson 2010, 245). For example, email, social networking sites, and computer games might all vie for a writer's attention and interest when she otherwise intends to work strictly on a book manuscript on their computer. Instead of adopting strictly internal self-control strategies, the writer might instead employ a software program (one such program is interestingly called "Freedom") that blocks her from opening other computer applications (besides the word processing program) or from visiting certain websites for those designated periods of time in which she really wants and intends to write (Heath and Anderson 2010).

Neil Levy (2007) highlights the range of ways in which, like Ulysses tying himself to the ship mast while passing by the Sirens and commanding his men not to listen to any orders he might give at that particular moment, we utilize other people and environmental structures in order to preserve and maintain convictions and commitments made autonomously during a prior state of lucidness and rationality. For example, putting time locks on alcohol cabinets, removing any objects that might remind recovering addicts of drugs, or choosing different routes home from work that avoid places to purchase an addictive substance (alcohol, cigarettes, candy) are all environmental strategies that externalize self control mechanisms (Levy 2007, 215-219). In all of these cases, the volition to do or not do some action is not maintained as an internal mental representation holding sway over an agent's will (an act of mental fiat), but instead agents utilize aspects of the extraorganismic environment to express, realize, and maintain parts or all of certain volitions.

Analytical and Reasoning Skills

Richard Menary (2007) has argued that some instances of writing should properly be understood as forms of thought, as he puts it, "Creating and manipulating written sentences are not merely outputs from neural processes but, just as crucially, they shape the cycle of processing that constitutes a mental act. Completing a complex cognitive, or mental, task is enabled by a co-ordinated interaction between neural processes, bodily processes and manipulating written sentences" (622). By engaging external mechanisms, we are able to subject initial/partial representations to new transformations and modifications that allow us to develop or carry out more advanced and novel forms of thinking.

For example, the common practice of journaling (whether privately in a notebook or publicly on a blog or social network site) can serve as an analytic conversation with oneself (or an imagined or real audience) about the kind of person who one is, has been, and wants to be. The relative permanence of the written words is significant in providing an ongoing record with which to iteratively interact over time so as to assess changes or consistencies in one's self in any given entry.

A Summary of Progress Thus Far

To summarize, artifacts and the environments that structure those artifacts are important for both individualistic, brainbound thinkers and dependent, situated thinking creatures. For both, objects have pragmatic significance as means by which to achieve certain goals (e.g. rest, pleasure, survival, honor). However, where the hyper-individualistic, brainbound thinker exists alongside the world of objects, and accordingly brings various internal reasoning processes to bear on the use of certain objects, the dependent, situated thinker is frequently enmeshed with the world of objects such that various thought processes are enabled or positively augmented through the use of objects and environments that structure the arrangement of objects. To understand the thought process of a dependent, situated thinker is to recognize that, at times, the relevant unit of analysis will be the embodied subject as it engages with some object or environment as a form of epistemic action in contrast to strictly pragmatic action.

Under the class of general epistemic actions, are those specific epistemic actions that are utilized to think about goals, convictions, commitments, plans, hopes, dreams and other identifying features that constitute our practical identities, in short, that are utilized to engage in a certain amount of self-definition, self-development, and self-direction as an expression of autonomous deliberation about the way in which one chooses to live out his or her life. Not only does the dependent and situated thinker utilize objects and structures in order to think generally, but also to think specifically about the trajectory of her life, what she has already experienced and what she hopes to experience, what she intends to accomplish today and across the space of a lifetime. This contrasts with the hyper-individualistic, brainbound thinker who instead appears to form goals and plans for himself through a process of internal, self-reflection that is then brought to bear on the world of objects and structures in order to achieve the previously specified goals (pragmatic action). A good example of this is Harry Frankfurt's (1998) conception of the autonomous individual as a rational agent that introspects to determine hierarchical levels of volitional desire that subsequently give rise to action.[9] Accordingly, autonomous deliberation is indexed to the portable brain and body of the individualistic, brainbound thinker. However, for a dependent, situated thinker, autonomous deliberation is properly indexed to the reciprocal relationship between an embodied subject and various objects often positioned in specific built environments. Situated forms of autonomous deliberation can be most clearly glimpsed by observing the ways in which certain agentic skills that constitute overall autonomy competency are not only deployed on or in a material environment, but are sometimes developed and realized in conjunction with object(s) and structured spaces. This represents a considerable shift from seeing the material world predominantly as a threat to autonomous decision making through its ability to coerce or constrain (e.g. the meth addict's apartment littered with temptations and opportunities to get high) to instead acknowledging the vital role of the material

[9] There does not seem to be anything that would keep Frankfurt's (1998) account of autonomy from being adapted to some forms of situated cognition, but as it presently exists, it has the cast of the classical philosophical ideal of the lone thinker retreating into a pure interior mental space to evaluate various levels of volitional desire.

world to not only provide secure spaces in which to engage in deliberation, but, even further, to actually be actively utilized in the work of deliberation itself.

Varying Forms of Damage and Response

These differences between the two conceptions of persons are important because they alter the way in which we understand damage done to a person's material environment and therefore the fitting moral response. When some damage is done to a hyper-individualistic, brainbound thinker's material possessions there may be a clear harm to the person's ability to carry out certain pragmatic goals (e.g. completing a job and earning a livelihood, eating and sleeping, caring for a sick family member), but there will not be direct harm to the processes of thinking in virtue of the fact that thinking processes on this brainbound conception do not rely on artifacts or arrangements of artifacts for their success or realization.[10] Alternately, when damage is done to some dependent, situated thinking creature's material possessions, beyond any harm to that person's ability to carry out certain pragmatic goals, there may be additional direct harm to the ability to carry out certain thought processes and to engage in self-deliberations that allow an individual to achieve a measure of personal autonomy. In each of these cases, the fitting moral responses to address the basic damage done varies with respect to the picture of human persons that is employed because the damage in each case will be different.

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[10] Certainly material environments, such as a home, sometimes provide individuals with secure and safe spaces in which to engage in self-deliberative thought processes apart from the control or manipulation of others. Thus, if a secure and safe space is lost, the process of self-deliberation may be at greater risk of not being autonomous in the sense of being free from undue influence or coercion, but thinking processes could still occur because these do not depend on any active engagement with the home or artifacts in the home (on a brainbound conception of persons).

Drawing on work in Chapter 2 regarding the distinction between repair and mere replacement, I argue that a commitment to engage in repair corresponds with that of persons as dependent, situated thinking creatures, while a commitment to mere replacement more adequately matches a picture of persons as hyper-individualistic, brainbound thinking creatures. Recall that in Chapter 2, I distinguished the process of repair from mere replacement by observing that repair work takes the damaged remainder seriously either by salvaging it or otherwise by using it as an essential guide that shapes any subsequent repair work. Further, unlike mere replacement, new parts or objects are not merely dropped into place or put into hand, but rather they are *fitted* or *meshed* into places and spaces that are already worn and shaped by the other surrounding parts, just as the repaired object is eventually *fitted* or *meshed* back into a place of ongoing use by a particular individual or community. Repair aims to fit/mesh the object back into the space of a lived milieu. This lived milieu has two dimensions: 1) within the object itself (between constitutive material parts), and 2) the object situated within a larger socio-temporal horizon of use by an individual or community.

Now consider the case of Jane. One day, an arsonist named Bill, sets fire to Jane's house while she is gone for the day. By the time the fire department arrives and extinguishes the fire, much of Jane's material possessions are badly damaged, though not destroyed. If Jane is understood to carry out thinking processes strictly within her brain, which is still very much alive and well, then the damage done is damage to Jane's personal property. Of course, this does not necessarily reduce the significance of the damage done, and Jane would likely suffer a range of harms. Jane might have been a self-employed web consultant, and when Bill the arsonist set fire to her house, he also damaged all of her computers, hard drives, software, and the digital files contained therein, such that she cannot carry out her work or deliver the products promised to her clients. Jane's ability to earn income and support herself has been compromised. The fitting moral response necessary to address the basic damage in this situation would at least be the replacement of the personal property that Jane lost in the fire. That is, Jane, as a still completely functioning thinking creature (because here brain was unscathed by the fire), who can also specifically engage in self-deliberative thought processes that are continuous with past self-deliberative thought processes before the fire, can take the replacements (or money for replacements) put into her hands and set about the task of setting up for work again in another house or in the rebuilt version of her old house in ways that reflect and serve to realize various autonomously chosen goals and plans that she had previously chosen and now again chooses/endorses for herself.

However, if Jane is understood to carry out thought processes that are more deeply enmeshed with various objects or structured arrangements of objects, including the structuring role of her home, then the damage done will not be damage simply to personal property used for a variety of pragmatic purposes but also damage to past traces of thought, the means for ongoing thought, and also potentially the means for substantial autonomy competency. The damage done in this case is more fundamental in that its effects reach to the very capacities of the thinking subject. The fitting moral response necessary to address the basic damage in this latter scenario will be at least repair, whereby generic replacement objects or structures are not simply put into Jane's hands, but rather efforts are taken to work with her to consider and utilize the remainder of any damaged objects and structures, to properly assess the extent and nature of the damage (which will be both pragmatic and epistemic), and to help put objects back into certain relationships with Jane.[11]

Cognitive-Agentic Repair

Up until now I have referred only generally to repair as applied to the material worlds of dependent and situated persons, but, mindful of the ways in which repair takes some of its contours from the specific thing to be repaired (e.g. archival repair, automobile repair, etc.), it is better to specify a particular type of repair that focuses on the epistemic, material scaffolding that is integrated with dependent and situated persons. I am calling this more specific account of repair, "cognitive-agentic repair."

As a type of repair, cognitive-agentic repair's goal is to make some object or arrangement of objects ready for reliable use again by a particular individual or a community (e.g. a family or group of friends). Based on my account of repair in Chapter 2, this will require:

1. Careful study and identification of the damage done (What is the whole of the object to be repaired?)
2. Investigation of the cause of the damage and devising appropriate solutions that account for this cause so that an object can be *reliably* used again

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[11] Interestingly, there is some evidence of this distinction between the response of replacement and repair in California law, where a voter initiative called the Victim's Bill of Rights, allows judges to either order the re-payment of the cost of damaged property or the full repair costs as restitution. In one case, a man vandalized a woman's old pickup truck (worth an estimated value of 950 dollars), however the judge ordered him to pay the full repair costs for the truck, which came to 2,800 dollars (three times the value of the truck itself). (Bay City News Service 2012)

3. Understanding the materials under consideration and the constraints these impose on repairs that avoid further damage
4. Consideration of how an object has been used by an individual and community and will be used in the future
5. Fitting the object back into lived relationship with an individual or community, which will involve attending to the damaged sense of trust/reliance between an individual and some object(s)
6. A posture of humility that considers the particularity of the damage done and also admits a certain amount of fallibility in repair and thereby strives to make room for necessary, future repair work

As a specific instance of repair, though, cognitive-agentic repair comes in two major varieties, the first (designated "Type 1") is the effort to mend human, cognitive processes by attending to damaged objects and arrangements of objects that otherwise serve to extend or embed human cognitive processes. These extended/embedded cognitive processes are especially significant because they can and do serve to realize more general agentic skills that enable varying degrees of personal autonomy. Therefore, cognitive-agentic repair is not simply the repair of extended/embedded cognitive processes for the sake of facilitating more human thought, but, rather, for the purpose of enabling the enactment of a degree of personal autonomy by which we plan and organize our lives from a position of self-authenticity.

The damage to extended cognitive architecture that I have in mind comes in three varieties, which in turn warrant three variations or stages of cognitive-agentic repair.[12]

1. First, some discrete material artifact that is bound up in cognitive processes/agentic skills might break down in some respect (e.g. when a computer malfunctions).[13]
2. Second, a particular arrangement of several artifacts may be disrupted so as to thwart some kind of cognitive processing (e.g. when a carefully arranged desk space is turned upside down).
3. Third, the relationship of trust/reliance between some individual and an artifact might be distorted or lost (e.g. when an individual learns that entries in his private journal have been altered or destroyed).

Each of these three forms of damage is either multiplied/deepened or reduced depending on the strength of the cognitive processing relationship that existed between the

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[12] Here and elsewhere, I talk about the repair of a material artifact or structure. However, given what I said in Chapter 3, an individual may sometimes utilize other people for certain aspects or forms of cognitive processing as well. Therefore, there is an important sense in which cognitive-agentic repair is not focused exclusively on material objects, but also on personal relationships as well. I focus on the repair of material objects because in the next chapter I make the case that this commitment to cognitive-agentic repair should shape our design, implementation, and selection of technologies. However, in future work, I would like to more clearly address what the cognitive-agentic repair of personal relationships might entail and how it compares and contrasts with cognitive-agentic repair of technologies. In particular, it seems that the malleability of technologies versus persons will be an important factor in how any repair efforts unfold.

[13] Recall that in Chapter 3, I claimed that a significant cognitive processing relationship exists between an individual and an object(s) or another person when the object(s)/person:

1. Is reciprocally engaged with during a specific cognitive process so as to achieve the completion of the intended cognitive task, such as remembering X or problem solving Y (e.g. an Alzheimer's patient's interaction with his memory notebook allows him to remember information he otherwise would not).
2. And/or, an individual depends on some object(s) or persons to supply information in ways that allows him or her to perform a specific cognitive process
    a. Faster (e.g. the Tetris player mashing a keypad button to determine the best orientation for a zoid shape on the computer screen), or;
    b. More accurately (e.g. computing large or complex sums on paper), or;
    c. More comprehensively (e.g. an artist exploring alternate possibilities through sketching in advance of creating the artwork).

individual and some object(s). The strength of the cognitive processing relationship will vary along at least three dimensions:[14]

1. Reliability
    a. The reliability of access to the resource (Clark 2008a; Sterelny 2010)
    b. The reliability of the information conveyed in or through the resource (Sterelny 2010)
    c. The reliability of the resource to function properly
2. Skillful Engagement
    a. Frequency of using a particular resource (Clark 2008a)
    b. Customization/individualization of the particular object (Sterelny 2010)
    c. Adaptation of physical routines to the particular resource (Sterelny [2010] calls this "entrenchment")
3. Plasticity
    a. Access to alternate means of carrying out some cognitive process/task
    b. Access to redundant forms of a resource (Sterelny 2010)

If an object is highly reliable, deeply integrated into skillful routines, and is unique in form and/or function then it will likely elicit a stronger cognitive relationship (the converse characteristics will likely elicit a weaker relationship). Cognitive-agentic repair then will not only attend to various forms of damage, but will also, other things being equal, attend first to those object(s) that are in stronger cognitive processing relationships

[14] Kim Sterelny (2010) employs a similar though different set of categories/dimensions to explore various ways of relating to cognitive artifacts and persons.

with an individual and, therefore, are likely to be the sites of more pronounced and significant damage.

The second variety of cognitive-agentic repair (designated "Type 2") is a more functional oriented repair in which, following some trauma to an area of the brain (and the associated cognitive processing) that cannot be repaired at the level of the brain (e.g. through brain surgery or pharmacological intervention), efforts are made to mend the damaged cognitive processes, nonetheless, by interfacing the person with suitably specific external, material scaffolding that can serve to realize or facilitate parts of the cognitive processes instead of the damaged neural matter (of course this assumes that there is enough functional neural material to still appropriate and engage with the external, material scaffolding). When the cognitive processes being repaired are also understood to be involved in enacting various agentic skills and generally a sense of personal autonomy (e.g. in the case of memory processing), care needs to be taken to integrate external, material scaffolding into not only an individual's cognitive processing, but also her sense of who she has been. An excellent example of cognitive-agentic repair (Type 2) is the health care practice of helping patients suffering from some kind of memory disorder to develop a memory book in which they detail especially important information that they can turn to and utilize in carrying out daily life (e.g. autobiographical information, calendar, things to do, feelings log, names, transportation information, a memory log of actions taken and decisions made) (Menary 2012; Schmitter-Edgecombe et al. 1995; Uchida et al. 2007; McKerracher, Powell, and Oyebode 2005; Sohlberg and Mateer 1989). The notebook is new to the individual, but care is taken to mesh the information in the notebook with who the person has been. Significantly, once cognitive-agentic repair (Type 2) has occurred, it may happen that the relevant epistemic, material scaffolding (e.g. a memory book) becomes damaged, and then the first variety of cognitive-agentic repair (Type 1) will be necessary.

Thus, cognitive-agentic repair may in any given situation be aimed at (1) repairing a discrete material artifact, (2) an arrangement of artifacts, (3) the relationship of trust/reliance between an individual and cognitively significant artifacts, and/or (4) the cognitive process associated with a damaged/diseased and irreparable brain area. Cognitive-agentic repair does not only target the broken technology or arrangements of technologies, but instead also aims to address the relationship of reliance or trust between a person and the object. To carry out a complete cognitive-agentic repair of the technologies requires attending to both human persons and artifacts as they are bound together by the act of cognitive processing leveraged for the purposes of achieving a measure of personal autonomy.

Cognitive-Agentic Repair as the Fitting Moral Response

There are at least four important arguments for why cognitive-agentic repair (instead of mere replacement) should be understood as the fitting moral response when a person is recognized as using extended/embedded cognitive processes.

Argument 1

Damage to material possessions structured by a home can be extensive enough that it either substantially hinders or halts the ability to carry out certain forms of cognitive processing and agentic skills. Imagine a person who returns to his house after a hurricane to find it in a state of utter disorder; objects are badly damaged and strewn about the house. Were replacements simply to be put into the person's hands (or even less, merely money for replacements was put into his hands), he would likely be unable to put the objects and or structures back into a meaningful order owing to the fact that certain important cognitive processes and agentic skills that allow him to arrange his life as his life (autonomy competency) are impaired by the lack of sufficient, organized material scaffolding for those cognitive processes (which was previously provided the environment of his home that organized and facilitated the use of a variety of practiced technologies). The action of replacement would be ineffective.

Repair, though, does not simply involve putting a similar object back into hand, but instead aims to re-position it within a lived milieu of past and future use in a particular space, which will include attention to how an individual has utilized various objects and arrangements of objects for cognitive processing and more general agentic skills. Repair involves putting objects back into position and holding them in position long enough to enable certain forms of cognitive processing and agentic skills to reliably perform again.[15] Thus, any cognitive processing impairment that a person may suffer from when possessions are damaged can be augmented or compensated for by the ongoing and dynamic assistance of others who are prepared to undertake the work of repair instead of only replacement.

[15] In a future publication, I would like to develop this line of reasoning further as an argument for the value of in-home care-workers, who by virtue of their regular, daily presence are able to carry out this work of actually holding an object or structure in place long enough for a repair to be effective.

It might be argued that this argument misses the fact that at some point in his life, the individual did not have various material artifacts and structures in place to allow her to carry out certain cognitive processes for the purposes of self-deliberation (e.g. Jane as a young person just out of college may have moved into her home with relatively few possessions and only then begins to buy and organize various objects for pragmatic and epistemic purposes). Yet, certain basic, likely brain-bound, capacities allowed her to select a variety of external resources to mobilize for complex epistemic purposes. If she could do this then, why can't she now following the damage done? The adaptive brain that was able to assimilate resources then should be able to assimilate resources now; therefore, replacement is a suitable minimal moral response even when an individual is regarded as dependent and situated.

However, while an individual may adopt and adapt new material implements in different spaces and places over a lifetime—even at times to a considerable degree—it is a mistake to assume that this is a product of simply brain-bound cognitive processing or some kind of core of self-deliberation power that resides within the embodied subject. Instead, it may be the case that different epistemic, material (or social) scaffolding is utilized initially to implement and adapt other epistemic, material (or social) scaffolding that allows an individual to realize various cognitive functions, agentic skills, and general powers of self-deliberation. The initial material or social implements serve as supports for the recruitment of additional material implements, and once the new material objects or structures are in place, the old material or social scaffolding can be dispensed with. For example, Jane may have initially relied on family and friends to move the few possessions she had and to then help her arrange them in particular ways that help her to maintain certain practiced methods of thinking and agentic skills. Thus, while Jane was able to adopt and adapt new material implements, it may have only been in the context of utilizing previous material or social scaffolding. On this approach, the brain's capacity for adaptation or certain kinds of adaptation depends on the presence of epistemic, material (or social) scaffolding. The replacement action misses this, though, by assuming a brain-bound thinking thing capable of adopting and adapting new replacements without existing epistemic material (or social) scaffolding, and thereby it risks being ineffective.

Secondly, different stages of life or periods of illness may precipitate new reasons for epistemic dependence on the material environment (e.g. the onset of Alzheimer's disease). It would be a mistake then to assert that just because an individual might have had greater facility in leveraging brain-bound thinking processes to adopt and adapt new material implements for pragmatic and epistemic purposes at an earlier point in her life that she could necessarily still do the same now.

Relatedly, we might also imagine an individual who had previously engaged in more clearly brain-bound forms of reasoning and self deliberation but thereafter committed himself to a lifetime of utilizing epistemic, material scaffolding such that his skill in engaging with epistemic material scaffolding will have increased while his ability to leverage strictly brainbound-forms of thinking and self-deliberation will have atrophied or diminished.[16] Although this individual may still be able to employ more

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[16] Sparrow (2011) has done empirical research that suggests precisely this, namely that when people know that they will have access to information through an Internet search engine such as Google, they are more likely to remember where and how to access the information resource than they are to remember what the *Footnote continues on the next page.*

strictly brain-bound thought processes in the absence of material scaffolding, his ability to reason and deliberate may be dramatically slower or prone to additional errors and slips. Therefore, while an individual may be able to make some use of replacements aside from epistemic, material scaffolding, he may be at risk of greater hardships (lengthier time to re-organize or re-construct a particular damaged structure or space) or dangers (increased frequency of mental errors and slips) which would cause potentially more harm than good. This would render the action of replacement either ineffective or morally suspicious insofar as it leaves an individual potentially worse off than before.

Argument 2

The second argument is a variant of the first. The damage to material possessions might be such that the individual is still capable of engaging in some situated cognitive processing in virtue of having certain technologies (such as paper or a computer) at hand. Instead, the damage has specifically affected those technologies that allow her to carry out certain practiced agentic skills (e.g. ways of remembering specific and significant events and experiences in her life that serve as the foundation for making decisions about the person she wants to be and the things she really wants to do). That is, there might be a sense in which an individual could still have the capacity to scaffold memories in various technologies that are still functional, but is unable to recover memories about her past that are important to her sense of identity as it shapes what she wants to do now and in the future because the technologies that enable that agentic memory skill are damaged.

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information was. Recall rates for pieces of information go down when we have reliable access to technologies such as the Internet that can supply that information when we need it.

Were replacements for broken objects simply to be put into the person's hands, she might be able to arrange objects in some kind of meaningful fashion owing to persistent general cognitive processing capability, but it would not be an order that necessarily reflects how she had previously intended to live her life owing to the fact that the prior material structures that had allowed her to realize certain agentic skills and engage in self-deliberation and planning are not present or are not available for use when the replacements are put into hand. Instead, different means of realizing agentic skills and undergoing self-deliberation would have to be recruited in order to make use of the replacements as implements and expressions of autonomous decision-making. But different means may lead to more or less proficient agentic skills, which could alter the content and conclusions of autonomous decision-making. Or, the means might simply be of such a different kind (e.g. a previously materially scaffolded imagination enabled an impressive repertoire of counterfactual speculation and assessment in contrast to the more contracted repertoire of internal biological imagination) that they alter the content or conclusions of autonomous decision-making. Thus, merely supplying replacements will have caused an additional harm to the person by potentially forcing an *uninvited* discontinuity in the way in which a person intends to live her life.[17]

Repair, though, need not cause such a discontinuity. Instead, good repair work is appropriately mindful of not only the damage to an object or structure, but also the way in which a specific individual uses the object. In this case, cognitive-agentic repair work

[17] The emphasis on the discontinuity as *uninvited* is important. Undoubtedly people sometimes adopt new means of thinking about themselves and what they really want to do now and in the future. This can be beneficial and may even lead to increased personal autonomy. However, choosing to adopt different means in order to think differently is substantially different from being forced to utilize different means.

involves sensitivity to the ways in which individuals situate themselves relative to some objects so as to realize specific agentic skills and overall autonomy competency. Being aware of this relationship, the repairer can strive to re-instate the material implements of prior practiced agentic skills and general self-deliberation such that the means of determining the way in which one intends to live one's life presently is of one piece with how one had intended to live one's life, or at least has the potential to be of one piece, though an individual may choose otherwise.

Argument 3

The third argument is best presented as a response to the following objection. Suppose that Otto (from Clark and Chalmers 1998) uses a tablet computer as his memory notebook. One day the tablet malfunctions and fails, and he can no longer turn it on. This causes Otto considerable distress as he uses the tablet for a variety of important memory functions. Fortunately, though, Otto's brother, Milo, is prepared for just this occurrence and has an identical tablet computer ready with an exact backup of all of Otto's data. Milo simply replaces Otto's broken tablet with the new tablet and goes on his way, leaving Otto to go on functioning as usual with this new, but otherwise identical, computer. It would seem that Otto's ability to use the new tablet computer for his various memory tasks would proceed without any issue given the use of the same type of tablet computer and a backup of all the data. Thus replacement would seem to be a suitable response to Otto's damaged tablet.

Damage to an object, though, does not merely affect whether some cognitive processing can occur or not, it also affects the strength of the cognitive processing relationship between an individual and some object. Recall that in Chapter 3, I noted that, even though many objects could be used in situated cognitive processes, the relationship between any given individual and a cognitive technology would vary in strength depending on three dimensions: reliability of the object, skillful engagement with the object, and the plasticity of the object. When Otto's old tablet computer malfunctioned and failed, it did not only temporarily thwart certain cognitive processing abilities, but it also diminished the strength of Otto's cognitive processing relationship with the tablet computer by dramatically altering his assessment of the reliability of the technology. Not only was the tablet computer damaged, but Otto's relationship to the technology was also damaged.

When Milo simply put a new, but otherwise identical, tablet into Otto's hands, he partly enabled Otto to resume certain situated cognitive processes again, but he did not address the damaged relationship of trust/reliance between Otto and the tablet. No effort was taken to investigate what went wrong with the tablet (perhaps all the models of this particular tablet have a faulty processor or perhaps Otto had been using the tablet improperly so that he caused the malfunction), and therefore Otto remains deeply uncertain as to whether he can count on this new tablet to reliably perform as he needs it to. In fact, depending on his level of distress when the tablet initially broke, he may be apprehensive about even using this tablet computer again at all. The damage done was not completely addressed by the act of mere replacement. Instead, the action of repair, which focuses not only on setting an object back in order again, but also fitting the object back into a lived relationship and pattern of use with a specific individual is necessary.

Recall the example of the auto mechanic who does not merely set a car back in order, but goes further to explain to the car owner what went wrong, what was done to fix the problem, and what she can expect from the car in the future. This auto mechanic accomplishes a complete or good repair by endeavoring to set the previously broken car back into a reliable relationship with the car owner. Otto needs this same kind of repair work, whereby understanding what went wrong with his tablet computer and what can be done to fix it or avoid the same damage in the future, he can again count on the computer to reliably perform as he needs it to.

Argument 4

The fourth argument proceeds differently. Suppose the damage to some material possessions is such that it does not *demonstrably* affect thinking processes or agentic skills or general autonomy competency (the object is broken, but still usable, though at greater risk of failing owing to the damage done—imagine, for example, a computer infected by a pernicious virus). One response is to simply replace the damaged object in its entirety (e.g. instead of rooting out the virus and addressing any damage to the data, a new computer is simply provided). However, replacement of the entire damaged artifact would be unsatisfactory in such cases because the process of mere replacement, as I described it in Chapter 2, fails to take seriously the remainder of the damaged artifact or structure. The remainder of any given material artifact or structure is especially important because it is often the evidence of a highly particular means of realizing certain cognitive processes, agentic skills, and general self-deliberation for a specific individual trying to achieve a certain amount of personal autonomy in his or her life.

Consider that bound up in the general respect for individual autonomous decision making that is characteristic of modern democratic societies (indeed is the very basis for those societies) is not only a respect for the outcomes of autonomous decision making, that is the decisions themselves, but also the process of deliberation itself. This respect for the process of deliberation is reflected in a variety of accounts of personal autonomy that are concerned about whether the subject is suitably self-aware, whether reasoning processes are the result of indoctrination or brainwashing, or whether such deliberations are free from undue threats of violence, imprisonment, etc. For example, were a mad scientist to install a device in an individual's brain that allowed the scientist to influence and manipulate some thought processes, this would be a gross violation of the individual's ability to engage in free and intentional thought processes about how he understands himself and what he really wants to do now and in the future. We readily see the force of this violation because we understand that somehow the physical structure of the brain enables thought, and that tampering with that physical structure will sometimes alter thought. While thought may have been previously assumed to be an exclusively neural matter, research on situated cognition reveals that thought is sometimes also extended or embedded amidst various extraorganismic technologies. Altering these technologies can also alter thought. Therefore, to respect the process of self-deliberation/self-governance is to also be prepared to respect certain material artifacts and structures that an individual may utilize to determine various identifying commitments, goals, and plans for one's self, assuming such artifacts and structures do not unduly infringe on the capacity of others to engage in self-deliberation/self-governance.[18]

Replacement, though, risks disrespecting the sometimes highly particular and idiosyncratic means of self-deliberation that are expressed through the use of specific, perhaps even customized, objects when it merely discards the remainder of a damaged material possession and puts a functionally equivalent (though not strictly identical) object in its place without any further effort to mesh the new object with already well established and practiced routines that are conditioned by the look and feel of the previous, older object (think of a golfer that is adept with a particular golf club that has a specific look, weight, balance, and feel in her hands during a swing). Repair, by contrast, is committed to taking the remainder of some damaged object seriously.

The decision to replace an object in whole or in part is not a foregone conclusion at the beginning of a repair process. Instead, the repair may mesh remaining undamaged or salvageable material with new material to put an object in order again and strive to preserve the familiar mechanisms of thought and agentic skill for some person. Even if an object is largely replaced during an intended repair, the repair action more comprehensively tries to re-fit the object into its precise lived milieu by understanding the particular use of the previous object or structure in a specific context and ensuring that the object once again reliably performs in that context. The remainder of any object(s) during the repair process importantly guides the repairer in how any new

[18] Here I am gesturing to the important observation that cognitive-agentic repair always takes place in a larger moral universe replete with an array of sometimes competing claims and responsibilities which will need to be evaluated and weighed against one another.

material that is introduced will need to be adapted, modified, or adjusted to mesh with already existing structures and routines that form the context of the object(s). In this manner, repair aims to respect the particularity of an object for a specific person, and thereby also more effectively respects the precise means of autonomous decision-making in an individual's life.

Though the repair action is conservative, it also utilizes the remainder of any damaged material to better understand the cause of the damage and to possibly address that cause through some modification that will help prevent or diminish the frequency of the same damage occurring in the future. The act of replacement, though, may miss important clues to the cause of some damage by simply opting to replace the damaged object with a new object, and thereby also miss any opportunities to modify the object, patterns of use, or the environment in order to thwart that cause of damage. By attending to the remainder of a damaged object, the repair action further respects the particular means of self-deliberation by working to ensure the ongoing, reliable use of those specific material implements.

The Responsibility to Engage in Cognitive-Agentic Repair

Beyond simply claiming that cognitive-agentic repair is the more fitting moral response where dependent and situated thinking creatures are concerned, I will argue that when either intentional or unintentional actions are committed against or befall individuals whose cognitive processing is extended or embedded in the extraoganismic world such that their external cognitive architecture is damaged, then there is a prima facie responsibility to encourage, facilitate, and/or carry out the work of cognitive-agentic repair (Type 1). Additionally, when either intentional or unintentional actions are committed against an individual that results in irreparable damage to a region of the brain and the associated cognitive processing in that region, there is a prima facie responsibility to encourage, facilitate, and/or carry out the work of cognitive-agentic repair (Type 2). The justification for this responsibility can be found in each of three separate sets of considerations.

The Argument from Preserving Moral Understandings in Society

Although not without challengers and critics, a respect for the capacity of personal autonomy is amongst the most basic and accepted values in contemporary, liberal society and in various normative philosophical frameworks. As Marilyn Friedman points out, while autonomy is a philosophical term of art, the sense of the value of autonomy is captured in a variety of ordinary and familiar expressions in wide circulation: "being true to myself," "doing it my way," "standing up for what I believe," "thinking for myself," "being one's own person" (2003, 3). This is not to deny the many criticisms of various accounts of personal autonomy (e.g. being overly individualistic, denying the influence of socialization, privileging stereotypically masculine virtues, suffering from an endless regress to ever higher orders of reflective desires). However, the value of the general ideal of personal autonomy (aside from specific accounts), as that capacity of individuals to reflect on what they really care about, to deliberate amongst various possibilities for their lives, and to pursue actions that express and realize integral commitments and goals nonetheless persists.[19] Of course, it is not the only moral-social value, nor is it the

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[19] In *The Ethics of Authenticity* (1991), Charles Taylor offers a similar argument for the value of self-
Footnote continues on the next page.

preeminent value, but it is properly regarded as a vital value in modern democratic society.

Yet the value of personal autonomy or, more accurately, the ability of people to trust that personal autonomy is a value within their respective communities and larger society and that others are responsive to the meaning and significance of that value, can be damaged by those morally unjustified actions and attitudes that seem to deny or hinder the capacity of a person or type of person to develop and exhibit personal autonomy and are not repudiated by the community or redressed in some fashion. Importantly, mindful of the ways in which cognition and, more generally, deliberation may be scaffolded in the material environment, the ability to carry out autonomous deliberation can be denied or hindered by those actions that do damage to certain objects, arrangements of objects in a built environment, and/or to the brain itself.[20] To regain or re-establish the understanding that personal autonomy is a trustworthy value for the community or society will require what Margaret Walker terms moral repair, by which she means "restoring or creating trust and hope in a shared sense of value and responsibility" following some damage to the shared moral understanding (Walker 2006, 28). Part of the work of moral repair then involves actually acknowledging and addressing the wrong done and the damage caused. Cognitive-agentic repair (Types 1 and 2) is a species of moral repair that acknowledges

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fulfillment and the ideal of authenticity in contemporary culture, claiming that there are various degraded forms/accounts of the ideal of authenticity that are problematic, but which need not impeach the value of the ideal clearly understood.

[20] Of course, this was always possible to the extent that some actions could rob an individual(s) of a secure and safe space within which to engage in self-deliberation. However, when persons are understood as dependent and situated, the damage done strikes deeper and more directly at the very capacities of thought and deliberation.

and addresses a particular form of wrongdoing and damage that afflicts dependent and situated persons when artifacts, spaces and places, and/or brains are damaged. Cognitive-agentic repair then sometimes serves as a vital means by which to accomplish the more general goal of repairing the understanding that personal autonomy is a trustworthy value within various communities and society at large and that members of the community and society will be responsive to the meaning and significance of that value.[21] This entails that, while an individual or group that causes damage to another person's material possessions or brain may bear the most obvious responsibility to carry out or facilitate cognitive-agentic repair (Type 1 or Type 2), the larger community and society nonetheless have an interest in promoting and ensuring cognitive-agentic repair in order to maintain the shared understanding that personal autonomy is a trustworthy value in the community/society. Indeed, it may often be the case, particularly in cases of violent wrongdoing such as a home invasion or mugging, that the wrongdoer simply cannot or should not be relied upon to assist in the work of cognitive-agentic repair; instead, family, friends, and/or the larger community/society must take on this necessary work.

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[21] Some might argue that instead of multiplying species of moral repair (e.g. cognitive-agentic repair), we should simply call all of this work "moral repair." However, when Walker talks about moral repair, her emphasis is typically (though not exclusively) on repairing the relationship between persons. Cognitive-agentic repair focuses more deliberately on the relationship between persons and objects/structures. Additionally, while it is important to maintain and articulate general accounts of repair (as I do in Chapter 2), it is also important to develop specific repair traditions that develop their own subtleties relative to the material under consideration. The proper target of moral repair work are the moral understandings between persons in a particular community/society, but the proper target of cognitive-agentic repair is the epistemic material scaffolding as it is utilized by a particular human subject. While each type of repair is bound to overlap in some respects and reinforce the other, each is usefully distinguished in order to properly understand the exact nature of the damage done to the target of the repair and the repertoire of specific repair actions that will be necessary to repair that target.

The Argument from Care as a Basic Precondition for Society

The recognition that care is a basic precondition for the just society (Kittay 1999) offers a second justification for claiming a responsibility to at least encourage and facilitate if not also engage in cognitive-agentic repair (Types 1 and 2). Societies, as collections of rational subjects capable of deliberation and governance, are the product of prior and ongoing caring efforts both insofar as care workers maintain and preserve life when it cannot otherwise maintain itself (e.g. in childhood, or during sickness or injury) and also provide many of the formative experiences that enable the development of basic interpersonal, communication, and reasoning skills that are vital to becoming autonomous individuals. Societies then at least have an interest in affirming and encouraging the preservative and formative care of dependent persons (which is all of us at some point in life) in order to continue to preserve and develop human society. Where and when a moral commitment to reciprocity is recognized, the members of a society also have a responsibility to affirm, encourage, and take part in preservative and formative care work in order to acknowledge, fulfill, and honor the debt owed to others for prior care work or anticipated future care work. For example, John Stuart Mill (|1859| 2004) argued that individuals should be ensured a high degree of liberty in personal decision-making, but he also argued that individuals have a responsibility to contribute in some form to the society/government that ensures and protects that liberty.[22] In like manner, the members

[22] This principle of moral reciprocity can be observed in normative theories as contrary as Mill's version of utilitarianism and Kant's deontological ethics (e.g. as is evidenced in Kant's defense of a principle of beneficence in the *Groundwork of the Metaphysics of Morals*)

of a society that owe at least parts of their present life and capacities to past caring labors have a responsibility to encourage, affirm, and facilitate care work.

Cognitive-agentic repair (Types 1 and 2) is a kind of vital, preservative care work in which the goal is to re-establish and maintain a person's capacities for thought and deliberation amidst damage to the body or material artifacts and/or built environment. As a form of care work that will be necessary at various times and places, it falls to those that have benefitted from past care work or anticipate the need for future care work to also encourage, affirm, facilitate, and sometimes engage in the work of cognitive-agentic repair.

Importantly, the debt need not attach strictly to those who actually cared for you (e.g. parents may die before a child can suitably care for them during periods of sickness and injury). As Kittay (1997) observes, we can remember that those who cared for us were cared for by others before them, and we can continue this work of caring by caring for others who may or may not be able to directly care for us.[23] Kittay (1997, 233) refers to this as a principle of doulia, in which we do not strictly care for others because we expect precisely those people to reciprocally care for us, but rather "just as we have required care to survive and thrive, so we need to provide conditions that allow others—including those who do the work of caring—to receive the care they need to survive and thrive." This would then suggest that as a society we have a responsibility to establish

[23] Part of recognizing and accounting for our future care needs near the end of life should involve the recognition that we likely will not be able to precisely repay the debt of care to precisely those individuals who care for us then.

general conditions in which cognitive-agentic repair as a form of care can continually be carried out and received.

The Argument from Susceptibilities

While all human beings are *vulnerable* to various forms of damage and harm, not all human beings are equally *susceptible* to compounded harms when damage occurs. As Kottow (2003, 264) puts the distinction:

> In a nutshell, the vulnerable are intact but at risk, in the same way a fine piece of porcelain is unblemished but highly vulnerable to being damaged. The susceptible are already injured, they already suffer from some deficiency that handicaps them, renders them defenceless and predisposed to further injury; their wounds lower the threshold to additional suffering.

The wounds of the susceptible can be actual physical wounds or they can also be understood as various social structures, attitudes, and actions that disadvantage individuals or groups of people. When the same cause of damage befalls the vulnerable and susceptible alike, the susceptible are likely to experience more complex forms of damage owing to various difficulties in mobilizing necessary resources to survive and recover. Although some wounds that create susceptibility may be wholly accidental, other wounds may be more clearly the result of or aggravated by the particular actions and attitudes of other individuals, groups, and institutions (e.g. racist treatment of African Americans, sexist treatment of women, disrespect of the frail and elderly). Where actions and attitudes precipitate or aggravate the susceptibility to harm, there is a moral responsibility to diminish the range of compound harms that a person or group may experience during some adverse event.

Insofar as persons are variously dependent on material objects and structures, not only for pragmatic functions but also epistemic purposes, they are vulnerable to impairments and interruptions to various thought processes and forms of self-deliberation when an object or structure breaks down, is torn, burned, lost, collapses, decays, shatters, loosens, buckles, or is overturned and disordered. However, dependent and situated persons may be especially susceptible to compounded harms if the actions and attitudes, other persons/groups or social structures make it especially difficult:

1) To avoid damage to cognitive/epistemic architecture (e.g. fewer options for retreat from an area for frail, elderly persons or the physically impaired due to the way in which transportation structures and buildings are designed)
2) To gather and recruit the social, economic, and physical resources needed to carry out the cognitive-agentic repair of one's self and material possessions (e.g. individuals who are stigmatized and/or isolated due to skin color, physical impairment, or disease)

In these cases, those who are involved in creating or exacerbating the susceptibilities to various harms and damages have some responsibility to either assist in or facilitate the work of cognitive-agentic repair as a means of limiting and addressing the compounded harms/damages. Where an individual, group, or government fails to acknowledge this responsibility and assist or facilitate the work of cognitive-agentic repair, it may fall to another person, group, or community to assist with or facilitate cognitive-agentic repair so as to preserve the moral understanding autonomous deliberation (which may be scaffolded in the environment) is a trustworthy value within the community or society (as discussed in the first argument above).

Conclusion

Undoubtedly, each of these arguments raises a host of philosophical questions about how far precisely this responsibility to encourage, facilitate, or assist in cognitive-agentic repair might extend in various cases. What priority does this responsibility have over other responsibilities? How might an individual or group recognize their culpability in creating or aggravating susceptibilities to harm? When does the responsibility shift from facilitating to assisting in cognitive-agentic repair? These are good questions, and ones that need to be answered in order to fully apply a responsibility to engage in cognitive-agentic repair in actual, everyday situations. I would like to address some of them in future work. However, for my purposes here it suffices to make the case that there is a responsibility on the part of at least some people, and potentially large groups of people, at various times and places to encourage, facilitate, and/or assist in the work of cognitive-agentic repair.[24] This will be enough to make the case in the next chapter that, because of a need and a responsibility to carry out cognitive-agentic repair at various times and places, technologies should be designed and implemented in manners that allow or even encourage cognitive-agentic repair.

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[24] A qualification: the responsibility to encourage, facilitate, or assist in cognitive-agentic repair is one responsibility to be considered alongside other responsibilities in any situation of harm and/or wrongdoing, and therefore the extent to which cognitive-agentic repair can be achieved will need to be measured against the claims of other moral responsibilities. It just may be the case that in suitably desperate situations it is not feasible to try to repair material objects and structures in order to maintain an expansive repertoire of thought and self-deliberation. Instead, a commitment to simply preserving biological life, assuming the person wants to live, will trump other concerns. Or differently, if various epistemic material objects and structures are vehicles for content that causes harm or disrespect to other persons then it may be wrong to fully repair objects and structures that in turn lead directly to violent or oppressive actions towards other persons.

CHAPTER 5

TECHNOLOGIES AND THE STANDARD OF COGNITIVE-AGENTIC REPAIR

> Each social reality presents its own unrealized possibilities, experienced as lacks and desires. Norms and ideals arise from the yearning that is an expression of freedom: it does not have to be this way, it could be otherwise.
>
> —Iris Marion Young (1990, 6)

Introduction

As W.B. Yeats (1919) so eloquently put it, "things fall apart; the centre cannot hold…" Our lives are marked by the persistent experience of things falling apart. Variously, the things of our lives—the technologies that we utilize for pragmatic and epistemic effects—are disordered, misplaced, stolen, lost, infected, torn, ruptured, shattered, burned, loosened, bent, constricted, warped, buckled, shrunk, scratched, and decayed.[1] At some point, most, if not all, human beings will need some form of cognitive-agentic repair that makes broken things available for reliable use again. The goal of this chapter, then, is to set forth an argument for the design, implementation, and selection of technologies that not only make cognitive-agentic repair possible, but facilitate progressively better instances of cognitive-agentic repair. In this manner, cognitive-agentic repair can act as a productive ethical standard by which to shape our

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[1] When I utilize the term "technology" here and elsewhere, I have in mind the relatively intuitive sense of technology as a material object made by humans (e.g. pencil and notebook, a desktop computer, a photo album). Importantly, technologies are *not* limited to modern electronic inventions (such as computers, mobile phones, the Internet, etc.). Instead, technologies span the ordinary to the exotic, simple to complex, small to large, and have existed throughout human history.

creation and use of a range of everyday technologies. Thereby, beyond the ubiquitous standards of efficiency, aesthetic appeal, economy, safety, and sometimes environmental considerations that presently define our design and selection of technologies, we might develop a richer repertoire by which to imagine, develop, implement, and adjudicate between technologies.

The argument proceeds as follows:

1. If we have a responsibility to either establish the conditions for cognitive-agentic repair or to sometimes engage in cognitive-agentic repair (Type 1), then we should ensure that the technologies in need of repair are in fact capable of being repaired. This involves various persons and groups of people designing, implementing, and selecting technologies that *at least* allow for the practical possibility of cognitive-agentic repair.[2]
2. Based on the arguments presented in Chapter 4 (e.g. preserving moral understandings about the good of personal autonomy, the necessity of care, and the nature of susceptibility), human beings do have a responsibility to engage in cognitive-agentic repair in diverse circumstances.
3. **Conclusion-1**: Therefore, we should design, implement, and select technologies that at least allow for the practical possibility of cognitive-agentic repair as the circumstances warrant.
4. However, many modern technologies do not allow for the practical possibility of

[2] Recall that cognitive-agentic repair (Type 1) specifically addresses material objects and an individual's relationship with the object(s), whereas cognitive-agentic repair (Type 2) is a functional oriented repair of certain brain based traumas and diseases by way of artifacts and the built environment.

cognitive-agentic repair, or they discourage cognitive-agentic repair by making it especially difficult.

5. **Conclusion-2**: Therefore, it will be necessary to design, implement, and select technologies *differently*, namely under the rubric of cognitive-agentic repair.

Reparable Things

An important question at the center of this argument concerns whether technologies presently allow for or encourage cognitive-agentic repair. If they do, or more significantly, if technologies just naturally and consistently exhibit the quality of reparability, then it seems redundant or unnecessary to offer cognitive-agentic repair up as an ethical standard that should guide our design and use of a range of technologies. Someone might, for example, venture the argument that any technology that can be assembled can also be disassembled and repaired; repair is simply one possible action amongst other equally possible actions that can be performed on a lifeless artifact that is entirely subject to human volitions.

It is undoubtedly true that a number of technologies do allow for some measure of repair. For example, in 2005, Nicholas Negroponte, a researcher at the MIT Media Lab, created the One Laptop Per Child (OLPC) initiative (http://one.laptop.org/) with the goal of providing children throughout the world with a laptop designed specifically for their needs and circumstances. The result was the XO laptop, which began shipping to more than one million children in 2007. This laptop was unique because it incorporated a number of design features that were especially sensitive to the way in which children might use the computers in developing countries. For instance, the computer is sealed in such a manner as to resist damage from both water and dust. Even if the laptop is damaged, a standard screwdriver allows any user to quickly open the computer up and replace various parts that are both low-cost and easily replaceable. Apart from hardware considerations, a novel, open source (non-proprietary) software operating system, called Sugar, was designed for the laptop. As such, the laptop exhibits a certain transparency in that children and teachers alike can easily open up the laptop and study its inner mechanical workings, as well as legally examine and modify the open-source computer programming code that ensures the style and functioning of the computer operating system. This transparency of the technology facilitates its reparability.

A well-publicized example of this reparability was the case of a 5-year-old girl in Nigeria who took it upon herself to help repair some of her classmates' damaged XO laptops (Howard 2008). With the encouragement of her teacher, the young girl and other classmates set up a "Laptop Hospital" to help others repair and learn to repair the laptops. In this manner, the design of the laptop, which enables relatively simple and low-cost repairs, empowered children to devise and implement their own solution to the problem.

This kind of approach is not unique to the One Laptop Per Child Project. The Hewlett-Packard (HP) Z1 computer is designed for the general, commercial marketplace and exhibits an impressive array of features that enable easy repair. For example, a teardown (systematic dismantling) of the HP Z1 by the iFixit workgroup (http://www.ifixit.com) revealed thumb tabs on the side that allow the computer to be easily opened up, revealing the inner mechanical parts that may need to be fixed along with a detailed diagram to indicate where each of the components are located.[3] Almost none of the parts require a screwdriver, but instead can be pulled out with a quick release lever. The computer-processing unit is not soldered into the motherboard, but instead can be easily removed. Additionally, the LCD glass screen is not glued in place, but rather can be removed by undoing a series of screws. Further, HP offers accessible electronic manuals about how to perform service on the machine as well as videos for various repair procedures.

Finally, a design team based in the Netherlands, has developed an innovative smart phone design concept called “Phonebloks” (https://phonebloks.com/en) in which all of the parts are a series of discrete blocks that can be plugged and unplugged from a central circuit board. If the screen or camera on the phone breaks, you can simply unplug that specific block, and replace it with a new one; perhaps a camera or screen block that is better suited to withstand the kind of damage the phone has otherwise suffered. The plan is to encourage industry development of the various blocks for the phone, and then, instead of constantly upgrading or replacing the entire phone every time new features are developed, fashions change, or some part is damaged, consumers would instead simply replace individual blocks.

These technologies, though, do not just naturally embody reparability as part of their design. Instead, reparability is consciously endorsed as an ideal to strive for in design, and various features are added to allow for and facilitate repair. Indeed, these

[3] “HP Z1 Teardown.” iFixit.org, last accessed on February 27, 2014. http://www.ifixit.com/Teardown/HP+Z1+Teardown/8840.

examples stand out because they exhibit repair characteristics that many similar technologies do not exhibit (see the discussion of Apple computers below). Even those technologies that have a tradition of a certain degree of reparability (e.g. bicycles, or cars and trucks), do not always maintain that tradition of reparability (see discussion of "Right to Repair" legislation below). As will become clear in the following analysis, designers can make decisions that cause certain technologies that have otherwise been repairable to actually be less repairable. Therefore, at the least, repair does not seem to just be a natural, unintended feature of technologies, but instead must be deliberately accounted for in the design process.

The Irreparability of Things

In spite of the several examples of technologies that facilitate some measure of repair, a paradigm of replacement and disposability seems to predominate amidst the design and utilization of everyday technologies. Consider, for example, just some of the data on the problem of electronics waste (e-waste):

- The United States Environmental Protection Agency (EPA) estimates that in 2009, in the United States, 2.37 tons of electronic products were ready for end of life management (meaning either disposal or collection for recycling). "This represents a 122-percent increase in the quantity of discarded electronics from 1999" (EPA 2011b, 22). Driving this trend is a dramatic increase in the sale of new electronic products. The EPA estimates that 438 million electronic products were sold in 2009, which is twice the amount sold in 1997. This is due in large part to nine times the amount of mobile phones being sold over that period of time (EPA 2011a). In 2006, 100 million cell phones were ready for disposal or recycling; in 2009, 141 million were ready for disposal or recycling; and in 2010, 152 million mobile phones were ready for disposal or recycling (EPA 2011b). The EPA (2004) estimates that the average person only keeps her cell phone for 18 months.

- The United Nations sponsored Step Initiative (2013) estimates that by 2017 there will be a 33% increase in the amount of worldwide e-waste generated on an annual basis (a total of 65.4 million pounds in 2017).
- In the UK, the government sponsored WRAP initiative surveyed individuals disposing of electronics and household appliances at waste disposal centers (see Pocock et al. 2011). When asked why they were disposing of the item, 51% said, "It's not working/its broken," 24% said, "I just don't want it anymore," 22% said, "I'm replacing the item with a newer version." Respondents were further asked why they did not repair broken items, 47% said, "because its cheaper to replace rather than repair the item (or it's too costly to repair the item)," 31% said, "the item is beyond repair," 12% said, "I just don't want it anymore," and 7% said, "it didn't occur to me that repair was an option."

Giving vivid expression to the data trends, the marketing consultant Victor Lebow wrote in 1955:

> Our enormously productive economy demands that we make consumption our way of life, that we convert the buying and use of goods into rituals, that we seek our spiritual satisfactions, our ego satisfactions, in consumption…These commodities and services must be offered to the consumer with a special urgency. We require not only 'forced draft' consumption, but 'expensive' consumption as well. *We need things consumed, burned up, worn out, replaced, and discarded at an ever increasing pace.* [Italics my emphasis]

The data above indicates that, at least with respect to electronics, humans are living into this business strategy by consuming and discarding material goods at increasing rates. In 2003 Randy Mott, the Chief Information Officer and Senior Vice-President of Technology at Dell computers, channeled Lebow's sentiments when he said, "I believe in planned obsolescence…As you make technology decisions, you should also be planning how and when to obsolete that technology. An IT department should define itself by how fast it can change" (McKean 2003, 8).

Planned obsolescence is, as Giles Slade (2006, 5) defines it, "a catch all phrase used to described the assortment of techniques [technological innovation, psychological influence, adulteration of materials] that artificially limit the durability of a manufactured good in order to stimulate repetitive consumption." As Darren Blum, a senior industrial designer at Pentagram Design, which designs products for companies like HP, says, "We joke that we design landfills" (Spencer 2002).

While numerous technological innovations have come along that have made previous technologies obsolete (e.g. DVD and Blu-Ray players made VHS players obsolete), psychological obsolescence has proven to be a tremendously effective strategy for encouraging repetitive consumption. Psychological obsolescence generally involves changing the style of an object so as to provoke a certain amount of self-conscious concern for being out of fashion and thereby prompt consumers to buy the newest iteration of an object (Slade 2006). The result, as Henk Muis (2006) observes, is that the psychological lifespan of an object (how long a user wants to keep an object, irrespective of whether it functions properly) is often shorter than the technical lifespan of an object (how long the object can function based on design and material quality, costs of repair, and the availability of spare parts).

Slade (2006) describes (here summarized) the development of the practice of psychological obsolescence with respect to US automakers in the 1920's. When Henry Ford first built his Model T car for the masses, conscious of the business practice of planned obsolescence, he exhibited a contrarian conviction, claiming,

> We cannot conceive how to serve the consumer unless we make for him something that, so far as we can provide, will last forever…It does not please us to have a buyer's car wear out or become obsolete…We never make an improvement that renders any previous model obsolete. (Quoted in Slade 2006, 32)

For a time, Ford was rewarded for the durability of their designs with a majority share of the car market. But, through the 1920's, Ford faced increasing competition from General Motors under the leadership of Alfred Sloan, who introduced the practice of the annual model change, whereby the shape of the car, colors, and other stylistic features were changed without any major mechanical changes that provided new functions or capabilities. Nonetheless, people bought the new cars, and a struggling General Motors gradually gained significant market share. Even Ford eventually adopted this practice of the annual model change to remain competitive with General Motors and other car manufacturers. Thus, still functioning cars were made obsolete and discarded by appealing to consumers' self-conscious concern for appearance (Slade 2006, 49-53). Importantly, this emphasizes the way in which design trends can create a certain amount of detachment between consumers and their objects. The anticipation of new fashion trends that are intended to supersede old ones primes consumers to be perpetually ready to set aside the old in order to take hold of the new.

Undoubtedly, a complex array of factors are driving rates of consumption, replacement, and disposal (e.g. economic incentives, fashion trends, the development of new features), but amongst those factors are difficulties and disincentives associated with repair. As the WRAP survey (see Pocock et al. 2011) cited above indicated, a majority of respondents in the UK said that it was cheaper to simply replace an object than repair it. Replacement is economically incentivized over repair.

Closely related to the economic incentives/disincentives of repair are the increasing technical difficulties associated with the action of repair, some of which are exemplified in Apple computer design trends. Where previously it was possible to varying degrees to open up and replace individual parts in an Apple computer, and still is in some versions of their computers (e.g. the Mac Mini), increasingly their designs make it extremely difficult to open up, inspect, and repair/replace parts. For example, the remarkably slim design of the Macbook Air is enabled, in part, by the practice of soldering components onto the motherboard, thus prohibiting later replacements or upgrades of individual parts without replacing the entire motherboard assembly. Interestingly, Wiens (2012) has noted that Apple initially released this less repairable laptop alongside other more repairable versions of its laptops. Consumers, though, responded by buying more of the Macbook Airs, which grew to account for 40% of Apple’s laptop sales by the end of 2010 (Wiens 2012). In turn, two years later, Apple responded to consumer demand and released a new version of the Macbook Pro, which was deemed one of the least repairable laptops ever by the iFixit workgroup, who specialize in tearing products apart to assess reparability. According to iFixit, the 2012 Macbook Pro:[4]

- Uses proprietary screws that require specialized screwdrivers
- RAM (Random Access Memory) is soldered to the motherboard
- The battery is glued firmly into the case, making it very difficult to remove, and potentially hazardous if the tool used to dislodge the battery actually punctures the battery and causes lithium ion cells to explode
- The display assembly is completely fused together

Similarly, recent versions of the Apple iPad, an incredibly successful consumer product, have been judged by iFixit to be some of the least reparable tablet computers. Whereas the first version of the iPad utilized a simple tab system to open up the device, the front panel in newer versions is glued to the body of the iPad. This forces would be repairers to break open the device by heating up the glue so that they can then pry off the panel, which poses a considerable risk of breaking the glass screen. Like the laptops, the iPad batteries (a part often in need of replacement given a relatively short lifespan) are glued into the case.

In this manner, the iPad and similarly designed technologies are increasingly characterized by a certain opacity and obstructiveness to users. Users are able to interact with the surface of the technology, which includes the various apps and

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[4] Kyle. 2012. “Macbook Pro with Retina Display Teardown.” iFixit.org, June 13. http://ifixit.org/blog/2753/macbook-pro-with-retina-display-teardown/

services/functions afforded by the different apps, but the underlying programing code and hardware that produces those functions/services is obscured from view and made difficult to access and examine when repairs are needed (interestingly Microsoft's 2013 tablet device is called "The Surface"). As Albert Borgmann (1984) has observed, the means of production are increasingly separated from the commodity produced by the technology. In the case of Apple products, and computers generally, visual metaphors such as the desktop and windows facilitates easy use while requiring no knowledge or understanding of the underlying process of producing various computer-based actions.

Nor is Apple oblivious to the difficulty of user-initiated repairs to their devices. The instruction manual that comes with a 2013 Apple iMac computer, clearly states:

> Do Not Make Repairs Yourself: Your iMac doesn't have any user-serviceable parts, except for memory, which is user replaceable in 27-inch models only. Do not attempt to open your iMac. If your iMac needs service, contact an Apple Authorized Service Provider or Apple for Service.

Not only does this signal a lack of user-initiated reparability, but it also indicates the trend towards needing to seek out the services of a professional repair technician, who is otherwise likely a stranger to the user of a device/object.

Elizabeth Spelman (2002) delightfully describes the household as a repair shop, in which we can imagine a range of day-to-day repairs taking place (e.g. the mending of clothes, the replacement and repair of appliances, the bandaging of scraped knees, the repair of broken relationships). While some of these household repair activities can reliably continue to occur in the home (such as the repair of relationships between persons), other repair activities such as repairing a child's damaged tablet computer or e-book reader will (barring major design changes) increasingly need to be outsourced to specialized repair technicians who are capable of dealing with the peculiar challenges to repair that these complex devices afford. Indeed, as electronic technologies are increasingly integrated into clothing, it may become difficult for individuals to even mend clothing in the household anymore. Consider for example, the Galvanic Extimacy Responder Mood Sweater developed by Sensoree—a piece of clothing that changes colors to convey your mood based on sensors placed on the hand that measure levels of excitement (similar to lie detection technology) (Afzal 2013). On the one hand, this kind of technology offers a fascinating example of technologically enabled self-awareness and interpersonal communication, but it also introduces a level of complexity into traditional clothing that may make it difficult to repair by non-specialists. Thus, where the household once functioned, as Spelman (2002) puts it, as a "microcosm for the variety of repair activities that humans engage in," it may increasingly offer only partial glimpses of the range and depth of repair activities as the remote, professional repair technician assumes an increasingly prominent role.

On a popular technology news blogging site, TechCrunch, Matt Burns (2012) has even suggested that this lack of user-initiated reparability in Apple products (especially the iPad) is a good thing. He writes,

> The iPad, and its Android counterparts, are leading the charge into this brave new world of digital appliances rather than personal computers. The very nature of this new world demands products are replaced rather than put on life support. Without the quick purchase turnaround time, the innovation cycle will slow and perhaps cause the fast growing movement to collapse altogether…Innovation is fueled by profits. Without profits, companies cannot invest into [sic] research and development. If you do not buy a new tablet every several years, these profits will dwindle and

> cause innovation to slow. Companies like Apple do not make money on servicing products.

Even if this argument were conceded (in spite of some dubious assumptions), a problem with this approach is that, given the rapid pace of the upgrade/innovation cycle, particularly in consumer electronics, it may become increasingly difficult to actually replace the present version of some damaged device with the same version, which may be considered outdated and out of production due to more recent versions being put into production. Replacement is then not strictly replacement, but instead an upgrade, which may or may not have been what a consumer was looking for, especially if a steep learning curve is associated with the newer features of the upgraded device. Therefore, not only is repair being circumvented, but genuine replacement is also excluded.

Cars and trucks that were once considered highly reparable (think of Willie the auto repair mechanic discussed in Chapter 1), are now even difficult for specialists to repair due to the increasing amount of computer based electronics and proprietary software controlling various processes in modern automobiles. For example, an independent repair mechanic replaced a faulty windshield wiper switch on a 2004 Saab, only to discover that the new switch had to be integrated into the car's programming in order to actually work properly, but only the Saab dealership had the information necessary to carry out that kind of programming in the car (Loten 2011). If not programmed properly, the car's anti-theft system can engage and shut down the car completely. This happened to an independent auto mechanic after he changed the tires on a Mercedes-Benz vehicle (Levitz 2012). Because he could not obtain the requisite codes to program the car's computer system, the mechanic had to tow the car thirty-four miles to a dealership that could re-program the car (Levitz 2012). This is a growing problem for independent auto mechanics who often are not provided complete and/or up to date information about the computer systems in cars. Instead, the most complete and up to date information on the computer systems in any given car is often only available at the car manufacturer's various dealerships.

Automakers defend this strategy by claiming that they must guard their programming information in order to protect trade secrets and remain economically competitive (Loten 2011). Nonetheless, legislators at the national and state levels have drafted legislation (see HR 2057, "Motor Vehicle Owners Right to Repair Act of 2009") that would grant independent auto mechanics a right to be able to repair vehicles brought in for service.[5] This legislation requires automakers to share more information and tools with independent auto mechanics for working on the computer systems controlling most modern vehicles. However, the legislation has stalled at the national level, and has seen only modest developments at the state levels where it has faced fierce criticism and opposition from the major automakers (Right to Repair legislation was approved by the Massachusetts state legislature in 2012).

But damage does not affect strictly mechanical technologies. For most computer users, their day to day issues of brokenness involve bugs and glitches in software applications that shutdown, freeze, or prevent the application from opening correctly, which sometimes result in the loss of data (e.g. Microsoft Word suddenly shuts down in the middle of typing a document). Or a computer virus might infect the computer and

[5] Motor Vehicle Owners Right to Repair Act of 2009, HR 2057, 111th Congress. (2009).

either lockdown data, preventing users from accessing information, or otherwise corrupt data on the computer.

With the rapid growth of Internet based services and technologies (e.g. YouTube, Facebook, Gmail, Flickr, Blogger, Dropbox, iCloud, Evernote, etc.), people are engaged in a tremendous array of activities (archiving and sharing photos and videos, writing and storing emails, creating social network profiles and providing frequent activity updates, reporting and opining about the news, etc.) facilitated by a wide variety of websites. In the process, they generate and upload information that is then stored on remote servers often owned by private companies (as opposed to their own computer system at home or work, or, sometimes, in redundancy to information on their own computer). For example,

- More than one billion unique users visit YouTube each month and one hundred hours of video are uploaded to YouTube every minute.[6]
- In 2012, Nielsen reported that 6.7 million people publish blogs on blogging websites such as (Blogger, Wordpress, and Tumblr), while an additional 12 million people write blogs using their social networks.[7]
- More than 50 million people are registered to use the popular online storage platform, called Dropbox. One million files are saved every three minutes on the company's remote servers, and 500 million files are saved daily.[8]

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[6] "Statistics." YouTube.com, last accessed February 28, 2014. http://www.youtube.com/yt/press/statistics.html

[7] "Buzz in the Blogosphere: Millions More Bloggers and Blog Readers." Nielsen.com, March 8, 2012. http://www.nielsen.com/us/en/newswire/2012/buzz-in-the-blogosphere-millions-more-bloggers-and-blog-readers.html.

- In 2013, the Internet based note-taking service, Evernote, reported that it had 50 million global users.[9]
- As of December 2013, Facebook reported 1.23 billion monthly, active users of its social networking site.[10]

An increasing issue, though, is that websites and the companies that own and operate them do not last forever. Instead, companies and websites are sometimes sold and/or shutdown, and not only is a service lost but user data is also lost or made unavailable because the data resided on remote company servers that are now no longer in use. Some companies/web-services that have recently shutdown: Snapjoy (a photo sharing site), Editorially (a collaborative writing website), Google Reader (a news reader service operated by Google), Posterous (a blogging platform), MobileMe (a data storage service operated by Apple), Geocities (a once popular web site hosting service owned by Yahoo), Google Health (an electronic personal health record system operated by Google), Friendster (an early social networking site). In these types of instances, users suffer the damage of losing access to a potentially important service and also sometimes valuable information that was stored on now retired company servers that users cannot access.[11] In short, users are prevented from attempting to achieve a measure of repair.[12]

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[8] "Dropbox Fact Sheet." Dropbox.com, last accessed on February 28, 2014. https://www.dropbox.com/static/docs/DropboxFactSheet.pdf.

[9] Walker, Rob. "As Evernote Cult Grows, the Business Market Beckons." Businessweek.com, February 28, 2013. http://www.businessweek.com/articles/2013-02-28/as-evernotes-cult-grows-the-business-market-beckons.

[10] "Key Facts." Facebook.com, last accessed February 28, 2014. https://newsroom.fb.com/Key-Facts.

[11] Some companies, such as Google, have developed tools (e.g. "Google Takeout") that make it easier for users to export their data at any time to use elsewhere. Relatedly, sometimes when a company shuts down,
Footnote continues on the next page.

The trend to put more information on remote servers that are accessible through the Internet highlights a consequence of the increasing opacity of the underlying processes in any given technology. The more users can derive some service/function from a technology without needing to interact with the underlying processes of producing that service/function, the less important it is that the technology is nearby and available for interaction. To use one of Borgmann's (1984) well-known examples, the modern heating unit unlike the traditional fireplace, requires no interaction with its underlying machinery and structure to benefit from the heat that it evenly distributes throughout a building when functioning properly. Thus, the heating unit is removed and placed in a corner of the basement. In this manner, technologies not only exhibit a certain opacity to users, but also an invisibility as they are removed from view. The problem with the invisibility of various technologies is that it can make it difficult for other users to understand precisely how any given individual operates in relationship to a set of technologies. That is, if I regularly see my aunt flipping through an old photo album that is kept on the living room coffee table, I have some understanding of how she relates to that technology. However, if she were to utilize a pair of digitally augmented and networked eyeglasses capable of displaying pictures transmitted from a remote Internet database on the lens of her glasses, which can only be seen from her vantage point, then I

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it will make data available for users to download or export for a period of time (e.g. one month or a year) before the data becomes permanently unavailable (e.g. Google Health data was made available to download before the service shutdown).

[12] Interestingly, a web-based group called the Archive Team has developed strategies and technologies to try to collect and archive all of the data on soon to be shutdown websites (Schwartz and Talmadge 2011). The Archive Team will then re-publish the data on a network of servers that are accessible to previous users of the services. In this manner, the archive team achieves some repair for some users, though they are not always able to retrieve all of the data on the site before it shuts down.

am less likely to understand how she relates to that particular technology because it is invisible to me. The significance of this is that when things break down and are in need of repair, it can be difficult for other persons to assist in both diagnosing the damage done (as it may be removed from view). Additionally, it can be difficult to know how an individual related to some technology, and, in turn, how to put the individual back into a reliable relationship with the technology once repaired.

Getting Situated Amidst the Philosophy of Technology

To return to the earlier critic's argument, which suggested that repair is just one possible strategy among other equally possible strategies that are always available when dealing with human made technologies that are subject to human volitions, the above analysis is meant to challenge this assumption. Contrary to what some term the "instrumentalist" conception of technology, technologies are not simply neutral tools that users can freely choose to do with them what they will. Repair is not just one possible action amongst other possible actions that users can perform on or with various technologies. Instead, I have endeavored to show, albeit briefly, that the possibility of repair is frequently challenged by a pervasive pattern of replacement, disposability, and repetitive consumption. Variously, repair, if it is even considered an option at all, is made more difficult and less attractive than simply replacing the entire object under consideration. As the UK WRAP study (see Pocock et al. 2011) indicated, 7% of those disposing of products did not even think of repair as an option.

But neither is the above analysis meant to portray technology as a monolithic, autonomous force that is running roughshod over human existence. This approach, whereby technology is conceptualized as a unified phenomenon that operates beyond human control and frequently to the detriment of human life, is sometimes termed "substantivism." Several early philosophers of technology, such as Martin Heidegger ("The Question Concerning Technology"), Jacques Ellul (*The Technological Society*), and Lewis Mumford (*The Myth of the Machine*) are often associated to varying degrees with substantivism.[13] Instead, over the past forty years, philosophers of technology, such as Albert Borgmann, Langdon Winner, Andrew Feenberg, Hubert Dreyfus, and Don Ihde have carried out what Hans Achterhuis (2001, 6) calls the "empirical turn," whereby:

1. Technologies are treated less like givens, and, instead, the development and revision of specific technologies is studied.
2. Technology is not treated as one, monolithic thing, but instead a complex phenomenon consisting of many different parts.
3. The relationship between technology and society is no longer regarded as one-directional (e.g. instrumentalism or substantivism), but, instead, technologies and society co-evolve, shaping one another in the process.

To this end, Thomas Hughes (1994), trying to navigate between instrumentalist and substantivist readings of technological development, has argued that certain designs or patterns in technology can develop momentum as the technology becomes part of a system of interdependent parts, characterized by specialized knowledge and skills, special

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[13] A close reading of these thinkers often reveals a more nuanced analysis of technology then is otherwise attributed to them. Thus while there may be heuristic value in labeling their accounts as substantivist in contrast to more recent accounts of technology, it is also worth observing the limits of these labels (substantivist, instrumentalist). Albert Borgmann, for example, has developed certain Heideggarian insights in his own non-substantivist account of technology and thereby indicates some of the more subtle textures in Heidegger's thought.

purpose machines and processes, enormous physical structures, and organizational bureaucracy, all of which favor the continued maintenance and development of a particular technology or kind of technology as integral to the maintenance of the larger system. I locate my analysis of the patterns of repair, replacement, disposability, and repetitive consumption in this intermediate vein of thought in the philosophy of technology.

Technology is not one thing, nor is it a collection of entirely separate and neutral things. Instead, various patterns, possibilities, and tendencies exist within the socio-technological milieu (namely a pattern/tendency for replacement and disposability versus repair). The pattern/tendency for replacement and disposability gains momentum as it becomes part of a larger economic system replete with retail stores, marketers, magazines, television, websites, and manufacturing processes that thrive in a culture of increasing consumption.

While the pattern of replacement and disposability may have a certain amount of momentum in this present society, it is not impossible to alter. Hughes (1994, 112) observed that, “a system with great technological momentum can be made to change direction if a variety of its components are subjected to the forces of change.” Therefore, in the next section, I outline how cognitive-agentic repair might be made to serve as a standard that comprehensively shapes the design, implementation, and selection of technologies so as to bring about larger scale changes. Thus, in line with a responsibility to engage in cognitive-agentic repair at various times, the cognitive-agentic repair of technologies in relationship to persons would be practically possible and increasingly more complete instances of cognitive-agentic repair might be realized as the technologies are designed and implemented so as to better facilitate repair.

This commitment, on my part, to a comprehensive strategy of reform aimed at a wide variety of technologies may prompt the objection that my earlier argument for utilizing cognitive-agentic repair as a standard to shape the design, implementation, and selection of technologies is really only properly aimed at technologies that are utilized in various forms of cognitive processing that are instrumental to various agentic skills that allow individuals to achieve a certain measure of personal autonomy in their lives. But, if I am right that a certain tendency to replacement and disposal exists in this present society, and that it has a certain amount of momentum provided by a capitalist system that encourages repetitive consumption, then addressing just one limited type of technology will not be sufficient to disrupt the tendency towards replacement and disposal. Instead, a myriad of technologies will need to be made more repairable in order to disrupt the tendency towards replacement.

Even more, while it may be clear after the fact how certain technologies facilitate externalized forms of cognitive processing and contribute to agentic skills, it is not always clear in advance what technologies will be utilized and how they might be utilized for cognitive processing and agentic skills. Therefore, efforts to only target those technologies that might be utilized in various forms of external cognitive processing are likely to be incomplete. It is wiser to adopt the strategy of enabling the possibility of cognitive-agentic repair amidst a broad array of technologies available for everyday use instead of trying to determine in advance all and only those technologies that might be utilized for cognitive processing, and then shaping only those technologies with respect to the possibility of cognitive-agentic repair.

In fact, by allowing cognitive-agentic repair to function as a broader standard for the design, implementation, and selection for a wide range of technologies, it may encourage individuals to utilize even more novel and extensive forms of extended/embedded cognitive processing knowing that the technologies available can be reliably repaired when circumstances warrant. That is, some technologies might not even appear as serious contenders for use as elements of situated thought and agentic skills until the possibility of cognitive-agentic repair is made a priority in the design, implementation, and selection of those technologies. As such, the set of technologies that might be utilized in forms of situated thought and agentic skills cannot even be completely determined in advance of making the cognitive-agentic repair of a wide variety of technologies possible in the first place.

Challenges to Repair and Cognitive-Agentic Repair

In summary, it is helpful to ask, what challenges the possibility of repair generally? Given the analysis above, there are at least four general challenges to repair:

1. **Opacity**- Technologies are designed such that the underlying processes and mechanisms are opaque to users—that is, they are inaccessible or difficult to examine and/or understand (e.g. some Apple computers).
2. **Obstruction**- Technologies are assembled in ways that make it difficult or impossible to remove individual parts (e.g. the practice of gluing batteries into a computer or tablet case).

3. **Deficient Information**- There is a lack of information about the technologies that is needed to carry out a complete repair (e.g. independent mechanics who are not given sufficient access to proprietary information needed to program aspects of modern automobiles).
4. **Detachment**- Technologies in combination with market and marketing forces elicit less attachment to a specific device, and instead nurture a culture/pattern of disposal and replacement/upgrade (e.g. the pattern of the annual model change).[14]

As a species of repair work, striving to allow the practical possibility of cognitive-agentic repair will then involve addressing at least these four general challenges to repair (1-4). However, a further question can be asked: what challenges the possibility of cognitive-agentic repair as a specific type of repair practice? There are at least three general challenges to cognitive-agentic repair as a specific instance of repair:

5. **Specialist Repair**- Where repairs are possible, they are increasingly of such a technical/complex nature that they demand the knowledge and skill set of a professional repair technician, who may be familiar with and able to address the objective technical functions of a device(s), but will not necessarily know how an individual relates to and uses the device(s). The professional technician then may not be suited to addressing the important repair of the object in relationship to an individual (especially concerning the cognitive processing relationship between an individual and some object).

[14] While this does pose a challenge to repair generally, it may be less of an issue where the cognitive-agentic repair of technologies that assist in various forms of cognitive processing is concerned owing to the fact that the cognitive processing relationship between some individual and a particular technology does create a form of attachment.

6. **Invisibility**- As the means of producing some commodity are increasingly separated from the commodity produced (causing the invisibility of technologies in everyday settings), the relationship between an individual and various technologies becomes more difficult for another person to observe and thereby understand how to carry out a complete cognitive-agentic repair when some technology breaks down. This can also be regarded as a problem of deficient information, whereby there is not enough information about how a technology is positioned within a set of practices.
7. **Paradigm Challenge**- As discussed in Chapters 3 and 4, the assumption that persons are strictly brainbound thinking things (instead of situated thinking creatures) suggests a strategy of replacement instead of repair.

Therefore, to allow the possibility of cognitive-agentic repair specifically will involve overcoming these additional challenges (5-7) in addition to the challenges to repair generally (1-4). Overcoming each of these challenges, though, will often be a matter of degree, and thus, while there is a minimal threshold to pass to even allow for the possibility of cognitive-agentic repair, there is also a spectrum of gradations in overcoming these challenges by which cognitive-agentic repair is made possible in progressively more creative, thoughtful, and accessible manners. We can see more clearly how this might work by examining each of three stages of technology development and use.

1. **Design**- the complete process by which a device or object is initially shaped and given expression (though the design process often continues as new versions of a technology are developed and released upon feedback from users)

2. **Implementation**- the point at which a technology is made available to society, along with any other necessary supporting technologies, knowledge, skills, or processes to ensure uptake of the technology
3. **Selection/Use**- the stage at which consumers choose to utilize certain technologies

Design

Many of the challenges to repair/cognitive-agentic repair can and should be addressed at the level of the initial design or re-design of an object. In particular, issues of opacity, obstruction, detachment, specialist driven repairs, and invisibility can and should be addressed through alternative design practices. Here I will focus on suggesting certain general forms of change and leave the specific engineering issues to others who are trained in such matters.

Albert Borgmann (1984) distinguishes two predominant patterns of things in the present technocultural milieu, namely focal things and devices. Focal things (such as the traditional fireplace, a fly fishing rod, or the kitchen and its associated technologies) have a commanding and centering presence, meaning that they both 1) call for skillful engagement (nurtured by regular practice) in their performance and maintenance and 2) they also serve to orient and gather life in a particular space. Both the processes (means) and the products (ends) of focal things are unified by the user's engagement in the process of producing various goods afforded by the focal thing. In this manner, the focal thing exhibits 1) a certain transparency in so far as individuals understand to varying degrees how something works and also 2) accessibility in that individuals are able to engage with those underlying processes.

In contrast, devices offer ready commodities without the need for or even, sometimes, the possibility of ongoing skillful engagement with the underlying processes of production (Borgmann 1984, 42-47). In devices (such the Apple iPad, microwave, and television), the productive machinery (whether physical or code based) drops out of focus and into the unattended background, such that users are reduced to mere consumers of technological products or commodities. The means of production and the ends of production are separated from one another by hiding/obscuring the means of production, which then contributes to their opacity to users' understanding and, in turn, allows the device to be placed out of view where it becomes invisible. In this way, devices disburden the consumer from certain forms of work previously required to produce a good or commodity, but, in the process, also elicit less substantial engagement with the productive thing. The opacity and invisibility of devices challenge the possibility of repair, while diminished engagement with the thing precipitates less attachment to the productive thing hidden from view and more attachment to the commodity produced, thus inviting a pattern of disposal and replacement of the device while pursuing a constant or increasing supply of the commodity afforded.

As general types/patterns of technology, we can arrange the pattern of focal things on one end of a spectrum and the pattern of devices on the other. Individual technologies then exist along the spectrum and are either more device-like or focal-like in character. For example, the sealed nature of the iPad, whereby its underlying processes are hidden from view and difficult to gain access to, makes it more device-like. However, various apps on the iPad enable it to be transformed into a means of production that does elicit skillful engagement (for example, musicians have used the iPad to produce new forms of music), making it more focal-like. As a technology well suited for viewing by one person, though, the technology has less power to gather and orient other people in its production. Thus, the iPad exhibits some characteristics of a focal thing, while still clearly skewing towards the pattern of a device. Notably, the more the iPad or similar devices merely provide passive forms of entertainment consumption (e.g. listening to music, watching television and movies, etc.) they lose some of their focal character and become even more device-like in nature.

Borgmann's distinction between focal things and devices is helpful then, because it provides a general framework to address some of the challenges to repair. Things that are more focal-like better allow for the possibility of repair, whereas devices typically challenge the possibility of repair. Therefore, it will be necessary to develop and design technologies that have an increasingly focal character so as to ensure that cognitive-agentic repair is possible and increasingly better instances of cognitive-agentic repair might be realized. This will entail that technologies are designed in ways such that:

1. **The means of producing some technological commodity are increasingly transparent or at least potentially transparent (not opaque) to users' understanding.** This will variously involve ensuring that users can access and examine the underlying parts and processes of technologies, as well as ensuring that they can make some sense of the parts and processes. This may favor simpler designs, but it may not necessarily. As Don Norman (2011) has observed, even simple designs can be confusing (think of a large panel of unlabeled light switches). Further, we

enjoy and benefit immensely from some technologies that require a certain complexity of design (e.g. smart phones) (Norman 2011). The issue, Norman (2011) argues, is in how that complexity is communicated to the user. When the various aspects and functions of a complex design are communicated poorly to a user, it is judged/perceived as confusing. Confusion is then what needs to be avoided in developing technologies that are understandable, especially for the non-specialist user. For example, the designers of the HP Z1 (discussed above) took some steps to diminish user confusion by including a diagram of the various parts on the inside of the laptop case.

2. **The underlying parts, materials, and processes of a technology are accessible, not obstructive, to various forms of user engagement, including repair actions.** On a physical level, technologies should be assembled in ways that allow them to also be disassembled without having to cause or risk serious damage to the object. Using standard fasteners that require only readily available tools is one example of a design change that would better facilitate disassembly. In the case of information technologies (e.g. computer operating systems or websites), underlying code or personal data files should be accessible to users and available for modification and export as needed.

3. **The productive technology (not just the commodities it provides) invites regular skillful interaction such that it occupies a visible (not invisible) presence in a space or place, and thereby makes clearer the relationship between the user and the technology.** This places the emphasis on designing technologies that, instead of

functioning autonomously on the periphery of our activities, actually require a certain amount of ongoing user engagement to ensure their operation. As Borgmann (1992) remarks, "Things can be focal only in the care of human practices" (121). On this approach, technologies would be designed for dynamic user-technology collaborations. Designing these objects to be conspicuous amidst use would further facilitate their visibility. For example, Verbeek (2011, 101-102) describes an elegant electric/ceramic heater designed by Sven Adolph that consists of a heating element surrounded by ceramic shells of varying shapes that can be arranged in different manners to direct heat in several directions throughout the room. As a result, the heater does not withdraw from view once it provides heat, but instead, must be set in the center of the room where individuals sit around it to benefit from the heat it produces. The heater continues to require active attention and engagement from users who must re-arrange the ceramic shells to obtain the desired heating patterns. This technology is designed for conspicuous use that facilitates its visibility within a web of practices that take shape in a space.

Making technologies more transparent to understanding and accessible to repair actions facilitates the possibility of repair generally. Making technologies more visible and designing them in ways that are understandable to a non-specialist repairer facilitates the possibility of cognitive-agentic repair specifically.

Importantly, each of these design commitments requires designers to think carefully about the kinds of users for whom they design technologies. Not just in the sense of bodily capacities, but more especially in terms of how human beings typically think. As Don Norman (|1988| 2002, 1993) has argued, knowing that human beings often utilize features of the extraorganismic world to facilitate memory and reasoning processes should influence design decisions (see also Kirsh 2005). For example, placing more information in and on objects (such as the letters on a keyboard) can ease the memory burdens otherwise imposed on users and thereby minimize the frequency of errors made (Norman |1988| 2002). Or, designers can build various constraints into an object that ease the amount of information processing required (Norman |1988| 2002). For example, when a multi-part object is disassembled, there are potentially thousands of combinations into which the parts could be put back. Instead of having to remember the exact sequence or reason through all of the various sequences, a good design would ensure that the parts could only fit together in a certain sequence; thus, a quick process of trial and error of arranging each part readily yields the proper assembly (Norman |1988| 2002).

By designing technologies that reflect how human beings actually think, three important results follow. First, individuals are able to use an object more adeptly while avoiding errors and confusions about how to use the object, and consequently are likely to actually enjoy using the object, which will tend to increase a person's attachment to that object. A deeper attachment to objects can reduce the tendency to replace an object instead of repairing it.

Second, by making an object easier and/or more enjoyable to use, designers might increase how frequently an object is used and thus the level of skillful engagement with the object. In the case of technologies that are utilized for various forms of cognitive processing, increased use would strengthen the cognitive processing relationship between the user and the technology. Thereby, over and above any attachment derived from enjoyment, a deeper attachment through more skillful cognitive processing is facilitated. This additional attachment to a particular technology further serves to deflect the response of replacement instead of repair when some kind of damage occurs.

Third, by developing more technologies that have various affordances (design features that indicate how the object is to be used) designed specifically for situated thinking creatures (e.g. labels on a keyboard), those technologies collectively serve to point towards a conception of human persons as situated thinking creatures and away from persons conceived of as strictly brain-bound thinking things. Thus, when we think about how people might learn that human persons are better understood as situated thinking creatures instead of strictly brain-bound thinking things, we can imagine a top down strategy and a bottom up strategy. The top-down strategy is the more intellectual approach whereby individuals read dissertations like this one or books like Andy Clark's *Supersizing the Mind* to gain a different understanding of human thought.

The bottom-up approach is the materialist approach whereby individuals, through a process of observing others regularly engage with and also personally engaging with objects designed to facilitate situated forms of thought, are able to assemble a sense of persons, namely as situated thinking creatures. Consider a non-cognitive example: given the height, shape, and mechanics of a doorknob, we infer certain things about the kinds of people the doorknob was intended for (namely people of a certain height with opposable thumbs, etc.). Were we to encounter a very different kind of doorknob that is positioned and/or functions in an altogether different manner, we might imagine a very different kind of person or creature for which the doorknob was designed. Similarly with technologies designed to facilitate situated forms of thought, they can indicate or point to the kinds of persons for which they were designed. Though, importantly this bottom up approach is more likely to give rise to an *image* of persons instead of the more linguistically descriptive theory of persons in which philosophers traffic. Both strategies have value and are needed, as they serve to disrupt the paradigm of human persons as strictly brain bound thinking creatures, which can get in the way of seeing/recognizing the need for cognitive-agentic repair in various circumstances.

The Possibility of Self-Repairing Technologies

At this point, an interesting scenario might be ventured. Suppose that in the not too distant future some novel material was developed that facilitated immediate self-repair. Any objects made from this material would simply self-repair any time they were burned, scratched, bent, etc. It would, seemingly, be less important then to design technologies so that users could understand or access the underlying processes of technological production because the object would simply self-repair. Thus, instead of persons being responsible for repair work, the technologies themselves could be designed to take on some of the processes of repair. A utilitarian minded thinker might defend this strategy on the grounds that it maximizes the benefits for the greatest number of people. That is, technologies would be made more reliable for more people and repair work would not depend on the inconsistent and imperfect efforts of fallible human beings. But this argument overlooks the fact that when the process of cognitive-agentic repair is carried out through the assistance of other persons, it manifests a caring, human relationship. Here it may be useful to recover an archaic definition of repair as meaning “to adorn or decorate” (OED 2009). The work of repair, when carried out by other persons, adorns and decorates the caring relationships that exist between persons and draws attention to that relationship. Self-repairing technologies, while undoubtedly valuable in some respects, would, nonetheless, circumvent the indispensable role of interpersonal repair work in highlighting the web of care by which human life and society depend. By designing, implementing, and selecting technologies in ways that are mindful of the need for repair, we might better facilitate human repair efforts and also preserve the good of highlighting caring relationships through the work of repair.

Implementation

Any given technology is often part of a larger system that supports and facilitates the use of that technology (e.g. the Internet/web is made possible by a wide collection of data servers, satellite and wired communications, regulatory mechanisms, and knowledge about computer programming and website programming and design). Thus, how a technology is implemented in a society, namely what other technologies, information, skills training, etc., are made available alongside it, is crucial to the use of that technology. As such, it is important not only to design technologies that facilitate repair generally or cognitive-agentic repair specifically, but to also consider how those repairable designs are implemented so as to support the reparability of the technology. As was seen in the case of modern cars, while a variety of malfunctions and forms of damage can be repaired, the lack of complete and up to date information about how to re-program the cars to recognize a new part can make it difficult or impossible for independent auto mechanics to achieve a complete repair. Thus, an otherwise reparable technology is made more difficult to repair because of how it is implemented in the larger society; namely, fragmented and exclusive information sharing mechanisms challenge the possibility of repair.

Here I will focus on the general need for suitably wide and robust information and tool networks to support and facilitate the cognitive-agentic repair of specific technologies, arrangements of technologies, and the technology in relationship to an individual (recalling the various targets of cognitive-agentic repair described in Chapter 4). Cognitive-agentic repair will often require those most familiar with a person and how he or she is situated amidst technologies to carry out the repair or at least substantial parts of the repair. Therefore, information about specific technologies needs to be made widely available to non-specialists such as family, friends, care workers, etc., as they attempt a complete repair. Examples of this can be instruction manuals or service videos made available by designer(s) and manufacturer(s) of a technology. Or, it might involve the extensive knowledge base found on various Internet discussion boards, static websites, or video sharing websites, whereby those with knowledge and experience repairing some technology make it available to others through a public forum. Of course, knowledge is also transmitted outside of the Internet as neighbors, friends, colleagues, and family members pass along information and skills to address specific technologies.

But cognitive-agentic repair does not just target discrete technologies. Sometimes cognitive-agentic repair is concerned with an arrangement of technologies, such as when a desktop or home office is damaged and needs to be put back in order for reliable use again. In this case, instruction manuals and how-to videos provided by a company or stranger on the Internet will not provide enough information about how to put the technologies back into relationship with one another, which is particular to each person's arrangements of those technologies in a specific space.

It will be necessary then to gather information about how objects are arranged in certain spaces and how an individual relates to those various technologies. Much of this information gathering already happens on an informal basis through the day-to-day observations that spouses, family members, friends, and care workers make as they interact with another person. Sometimes, though, our observations are more formal. For insurance purposes we might assemble inventories of our own or a friend/family member's possessions. While inventories may be helpful to achieve replacement of those possessions when damage occurs, they will not be as helpful in completing a repair, which requires additional information about how all of the various things were organized and the functions they served in relationship to an individual person. Therefore, beyond simple inventories, narratives about the use of technologies will be especially beneficial to supporting and facilitating the work of repair. Here we might imagine playing the role of an anthropologist observing the material customs and rituals of a person(s) in a particular space/place. Some of this information might be written down, some of it might be conveyed through pictures, while other information may be stored in the biological memory of a particular person. It is important then that the written records, pictures, or biological memories of specific people can be located when damage occurs so as to glean the necessary information to carry out cognitive-agentic repair. This combination of people, written records, and pictures can be imagined as a hybrid network of information that exists in parallel to the more traditional networks of information available for specific technologies discussed above.

In addition to making these networks of information (both hybrid and traditional) widely available, or at least available to any persons who might be engaged in a cognitive-agentic repair project, the networks must also be robust enough to persist and be accessible as and when needed. For example, there is a tremendous wealth of information about how to repair certain technologies on Internet discussion boards, static websites, and video sharing sites, but any of these resources could disappear if a virus erased the server storing the data, or a company shutdown and turned off its servers. Similarly, written records and pictures can be lost, or people can move away or become estranged.

Redundancy of information offers one clear mechanism for creating more robust networks that can withstand various challenges. Thus, companies might create data backups, or groups such as the Internet Archive team (https://archive.org/) can attempt to assemble an archive of various parts of the Internet so as to preserve past iterations of various websites. Or a brother might share notes with another sibling about how mom and dad's computer is set up and organized to facilitate various actions and tasks.

Just as there needs to be wide and robust information networks available, there also needs to be wide and robust tool and parts networks available for individuals to carry out cognitive-agentic repair. While this already exists to some degree in the form of myriad and redundant retail stores, both physical and online, that can supply a huge variety of parts and tools to consumers as needed, there are more interesting possibilities. For example, starting in the Netherlands but now taking place worldwide, groups of people are organizing "Repair Cafes" (http://repaircafe.org/) where they pool tools, materials, skills, and information to repair various household objects (see McGrane 2012). These Repair Cafes are free to the public and are conducted in public forums such as a theater or community center. Importantly, individuals do not simply bring their broken objects to the Repair Café where a repair specialist then disappears into a back room with the device for repair; instead, when needed, specialists work with the individual to carry out a repair.

This Repair Café model helps to make the important point that repair need not be a hyper-individualistic endeavor in which each of us is expected to engage in our own repair work. Given the picture of human persons as dependent and situated thinking creatures that I offered in Chapter 3, just the opposite is true. We rightly look to other persons to augment and supplement our own skill set and knowledge in addressing any given case of damage done. What is especially beneficial about the Repair Café model, though, is that when specialists are necessary, they work with the individual to carry out the repair, as opposed to retreating into a back room that appears as a black box to the customer. This approach serves then to not only put an object back in order, but also more consistently ensures that an individual can understand what was damaged, how it came to be damaged, and what was necessary to set it back in order for use again. This deeper understanding then serves as good evidence for the individual to confidently trust/rely on the object to perform in a certain manner again. In short, the object is not only repaired, but the relationship of reliance or trust between some individual and the object is also repaired.

Interestingly, the Repair Cafes serve to gather and introduce people to one another as people with both needs and resources to reciprocally serve one another, thus nurturing, at least momentarily, a strong sense of community. In this manner, reparable technologies implemented together with information/tool networks such as the Repair Cafés exhibit the characteristics of a focal thing. Instead of mere consumers of the various commodities offered up by the large retail store, where we may never even interact with another human person given the advent of self-checkout technologies, Repair Cafes and similar enterprises draw us into a deeper engagement with one another and the repair process as tools, materials, parts, knowledge, and skills are gathered and exchanged in a public forum. Thereby, technologies might be implemented in ways that not only allow for the practical possibility of cognitive-agentic repair, but the experience of those information and tool networks (e.g. the Repair Café model) might also nurture our sensitivity to the need for cognitive-agentic repair and willingness to facilitate or engage in cognitive-agentic repair in certain circumstances.

Consider that, in Chapter 4, I argued (drawing on work by Margaret Walker [2007]) that one of the justifications for a responsibility to engage in cognitive-agentic repair was that in our present liberal, democratic society there is a moral understanding that personal autonomy is a good worth preserving. But the value of personal autonomy or, more accurately, the ability of people to trust that personal autonomy is a value within their respective communities and the larger society and that others are responsive to the meaning and significance of that value, can be damaged by those morally unjustified actions and attitudes that seem to deny or hinder the capacity of a person or type of person to develop and exhibit personal autonomy. Such wounds to a moral understanding are deepened when the community does not repudiate or redress them in some fashion. Communities then have a role to play in repairing both the victim's and the community's trust that moral understandings will be acknowledged and upheld when they have been damaged either by the actions of an individual, a group, or even society at large. However, this requires that communities exist in such a way that the members of the community acknowledge a certain amount of moral responsiveness owed to one another and recognize the value of certain moral understandings in enabling life together.

Not all forms of community are sufficiently deep, though, to inspire a sense of responsiveness to the needs of other people. For example, television can give us a tremendous sense of being part of the diverse and wondrous human race, but as a one way viewing experience, our sense of community is not interlaced with any sense of responsiveness to other human beings. As David Foster Wallace (1993) has observed, the television (which is now also included in the functions of smartphones, tablet computers, and desktop computers) is a voyeuristic technology that facilitates one-way watching in which viewers can observe other human beings without having to bear any of the emotional costs associated with actually being around those human beings. As a passive consumption oriented device, television does not encourage robust forms of responsiveness to the needs of others; a shallow sense of human community is conveyed through television.

By contrast, Repair Cafés facilitate gatherings in which individuals not only see a community of people take shape, but also experience their own needs and the needs of other persons (e.g. various repair needs) framed by a pool of shared resources (e.g. skills, materials, knowledge, etc.) that each individual brings and which can be utilized to address the needs of one another. In this space, needs and the means to address some of those needs exist in reciprocal fashion. This process of community centered repair work can play a valuable role in cultivating more extensive forms of responsiveness to one another, which is a necessary condition for the work of upholding and repairing moral understandings within a community. Thus, when autonomous deliberation is denied or hindered by those actions that do damage to certain objects or arrangements of objects that serve to scaffold cognitive processes instrumental to autonomous decision making, the community will be better prepared to engage in cognitive-agentic repair work as a fitting moral response to the needs of others in their community.

Selection and Use

Even if technologies are designed and implemented in ways that facilitate the possibility of cognitive-agentic repair, cognitive-agentic repair will not actually be a possibility in daily life until individuals begin to select and utilize those technologies (especially technologies that are likely to be utilized in cognitive processing and various agentic skills) that allow for cognitive-agentic repair. A commitment to facilitating the possibility of cognitive-agentic repair *should,* therefore, inform individuals' decisions about what technologies to select and utilize in their everyday lives. The "should" in this case can be interpreted as a prudential and a moral claim. If an individual scaffolds thought processes amidst technologies in various built environments (and we all do this to varying degrees throughout our lives), and wants to be able to rely on the continued functioning of those technologies because they contribute in some manner to his well-being, flourishing, or happiness, then he should (from the standpoint of prudence) take steps to ensure that those technologies can be subject to cognitive-agentic repairs when inevitable damage occurs that otherwise imperils the continued functioning of the objects.[15]

This does not mean that an individual would only select and utilize those technologies that he can repair himself. Instead, it means that an individual selects and utilizes those technologies that allow for cognitive-agentic repair either by himself or others. A repair specialist might have a valuable role to play in setting some object back in order, but cognitive-agentic repair requires more. Firstly, the damaged relationship of trust/reliance between an individual and some object needs to be addressed. Secondly, the object should be fitted or meshed back into an individual's lived milieu. Therefore, to allow for complete cognitive agentic-repair will entail that individuals familiar with some

[15] But here the prudential considerations are not strictly individualistic. As was argued in Chapter 4, technologies not only serve to extend or embed thought processes, but also specifically thought processes that are instrumental to the practice of personal autonomy. The legitimate authority of liberal, democratic government rests on the autonomous decision-making capabilities of its subjects. Therefore, liberal democratic governments and societies have an important political interest in promoting the practice of personal autonomy amongst its citizenry. Accordingly, while liberal, democratic governments should not force individuals to select or use technologies that are more amenable to cognitive-agentic repair, they should encourage individuals to select and use technologies that are more amenable to cognitive-agentic repair.

specific person's lived settings, habits, and patterns of use can be involved in the repair so as to both mesh/fit an object back into place and also address the damaged relationship of trust/reliance on the object.

Beyond a prudential claim, though, the assertion that individuals should utilize the standard of cognitive-agentic repair to inform decisions about what technologies to select and utilize can also be treated as a moral claim in some cases. For example, it is generally recognized that parents, morally, should work to ensure the best interests of their children, namely certain basic interests for food, water, shelter, as well as more complex interests for education, privacy, safety, etc. Children, as much as adults, are likely to scaffold thought processes amidst technologies and the built environment. However, young children, especially, are often not responsible for buying the cognitively significant technologies that they utilize (e.g. consider the experience of a young child being gifted her first computer or cellphone). Yet, children, as much as adults, have an interest in ensuring that certain technologies that might be utilized in situated forms of thought will reliably continue to function. Therefore, parents, as those who are frequently in charge of purchasing decisions and who are expected to ensure the best interests of their children, should select technologies for their children that are amenable to cognitive-agentic repair. This argument would similarly apply to family and friends who are in roles in which they are caring for other persons (such as the frail elderly or persons with cognitive impairments) and have either by default or by explicit request been empowered by that person to purchase and select technologies for that person to use. A best interests standard, whereby surrogate decision makers strive to make decisions for another person that are in that person's best interest, would generally entail that caretakers should select technologies that are likely to be utilized in forms of situated thought that are amenable to cognitive-agentic repair.

An initial question then is how will individuals recognize technologies that are amenable to repair generally and cognitive-agentic repair specifically? Mindful of the challenges to repair and cognitive-agentic repair outlined earlier, and the various design and implementation prescriptions that I have offered above as responses to some of those challenges, a set of questions can be set forth to guide the selection of some technologies while rejecting others.

1. Are the underlying processes and mechanisms of a technology or collection of technologies difficult to examine or understand for those who might need to repair this technology or at least assist in the repair of this technology (e.g. the non-specialist)? Or, does the technology exhibit a useful degree of transparency to the non-specialist?
2. Is the technology assembled or otherwise designed (e.g. proprietary coding) in ways that make it difficult or impossible to remove or modify parts as needed? Or, do the underlying parts, mechanisms, and processes of a technology allow or even invite user engagement in the form of repair actions?
3. Does the technology cultivate a sense of detachment? Or, does the technology nurture forms of attachment either through ease of use, enjoyment, or a stronger cognitive processing relationship?

4. Is there a lack of information about how to repair a specific technology or a collection of technologies? Or, is there sufficient information about the technology/technologies for a non-specialist to carry out or participate in repairs as needed?
5. Is the technology likely to be invisible amidst day-to-day use? Or, does the technology (not just its commodities) invite regular, skillful interaction such that it occupies a visible presence in a space/place?

Interestingly, the answers to many of these questions are not likely to be found by untutored consumers simply staring at/studying discrete technologies trying to determine levels of opacity/transparency, invisibility/visibility, etc. Instead, the various forms of information networks discussed under the implementation stage above will provide a vital resource to assessing levels of reparability in any given technology or type of technology. Thus, contrary to the consumer spirit of "What can this new product give me?", a consumer might instead begin by surveying various information networks that support repair efforts to determine, "What can this technology, once broken, be made to do again through repair by me and/or through the help of others?" In this manner, it is not the advertised functions of a brand new device that are decisive, but rather its durable functions—those functions that can be recovered through repair work—that are decisive in selecting one technology versus another.

The Formative Nature of Cognitive-Agentic Repair Work

In Chapter 4, I set forth several arguments regarding why we have a responsibility to facilitate or carry out cognitive-agentic repairs. This commitment to cognitive-agentic repair then warranted discussion in the present chapter (Chapter 5) about how we should better design, implement, select and utilize technologies that allow for cognitive-agentic repairs to be carried out on the technologies when they breakdown or become damaged. We might imagine an individual being convinced by my arguments for a responsibility to engage in cognitive-agentic repair, then selecting technologies either for themselves or others that are designed and implemented in ways that allow for cognitive-agentic repairs to be performed on them, and, finally, carrying out the actual work of cognitive-agentic repair when cognitively significant technologies do become damaged. This exhibits the pattern of well-formed reasons for a particular course of action giving way to the action itself; the justification for an action is formed completely in advance of the action. However, Talbot Brewer (2009) has observed that there are activities, what he calls "dialectical activities," in which "[the point of the activity] lies in an intrinsic goodness that is to some degree opaque to those who lack experience with the activity, but that tends to unveil itself incrementally as one gains first-hand experience with it" (39). Brewer goes on to cite the activities of friendship, intimate love relationships, parenting a child, and starting a conversation with an intriguing stranger as examples of dialectical activities (2009, 39). I want to venture that cognitive-agentic repair exhibits this pattern of a dialectical activity, wherein the justifying reasons for acknowledging a responsibility to engage in cognitive-agentic repair are glimpsed before the action of repair, but are unveiled or made clearer as an individual actually engages in the practice of cognitive-agentic repair.

For example, a person might be tentatively persuaded about the moral value and good of carrying out cognitive-agentic repairs in some circumstances, and then proceed to carry out cognitive-agentic repairs. But just as repair efforts transform broken objects, the process of repair also elicits various attitudes and dispositions in the repair person such that the repair person is also transformed to varying degrees by the process of repair. Remember that I noted (in Chapter 2) how repair work requires the repair person to develop skills of inquiry regarding the damage done, the possible causes of that damage, the object's past history of use relative to an individual and its hoped for future use by the individual. To do this well requires a certain humility of the repair person, whereby he does not merely project his own desires and preferences onto the object, but instead considers what the object needs (see Spelman 2002; Mumford 1952; Crawford 2009). Or more accurately, since what any given object needs is bound up in how an individual or community uses the object, the repair person learns to ask what the individual or community needs by way of the object. The practice of good repair then forms an individual to place boundaries on his or her own ego driven desires and preferences and to be more attentive to the needs and desires of other persons.[16]

Repair projects function in a way similar to Iris Murdoch's (1971) account of the moral significance of great art. According to Murdoch, great artwork can draw viewers out of a relentlessly anxious and self-absorbed state of existence and into a deeper

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[16] In future work, I would like to consider more fully how dispositions cultivated by repair practice could productively inform our relationships with technology generally. For example, how repair practice might cultivate a sense of humility that could inform our application of technologies to the natural environment (e.g. fracking or geoengineering technologies). This is very much in the spirit of Sara Ruddick's (1995) work on maternal thinking and how the practice of mothering cultivates various dispositions and understandings that can inform the ethics and politics of war and peace.

consideration of the world that imposes boundaries on our own egos and thereby begins to facilitate a more humble relationship with the world and others. From this posture of humility, we might perceive the needs of other persons, and, in particular, the ways in which they depend on various technologies for cognitive processing tasks, either more deeply, with greater nuance and subtlety, and/or more readily. In turn, our sensitivity to/perception of a responsibility to support and/or engage in cognitive-agentic repair amongst other forms of care is enlarged and developed. In this manner, the practice of cognitive-agentic repair has a dialectical character in that preliminary reasons to acknowledge a responsibility and a willingness to engage in cognitive-agentic repair are deepened and made clearer as we gain more practiced moral sensitivities to the needs of other persons. As we become more sensitive to or more perceptive of the needs of other persons, particularly concerning the ways in which scaffolded thought processes can easily become damaged and require repair, our commitment to designing, implementing, and selecting technologies that allow for the possibility of cognitive-agentic repair might be incrementally strengthened as well.[17]

Conclusion

In this chapter I have endeavored to show that even if we acknowledge a responsibility to engage in cognitive-agentic repair, we would not be able to carry out that responsibility completely or well given the current patterns of design, implementation, and selection of technologies that favor disposal and replacement instead

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[17] Andrew Light (2005), relatedly, considers that ecological restoration projects can have a similar salutary and formative effect in terms of increasing human sensitivity to the needs and health of the land.

of repair. In turn, I outlined several challenges to the possibility of repair generally, as well as several challenges to the possibility of cognitive-agentic repair specifically. I then showed how we might better account for and overcome these challenges through better patterns of technological design, methods of implementation, and criteria for the selection of technologies that account for the need for cognitive-agentic repair. In doing this, I showed how, beyond the standards of efficiency, aesthetic appeal, economy, safety, and sometimes environmental considerations that shape so many of our decisions about what technologies are acceptable or desirable in our lives and society at large, the further standard of cognitive-agentic reparability could be introduced to productive moral effect.

CHAPTER 6

APPLICATION: TELEMEDICAL TECHNOLOGIES

"…the right care in the right place at the right time."[1]

Introduction to Telemedicine

In this concluding chapter, I show how my account of cognitive-agentic repair might inform how we think about a particular set of technologies, namely telemedical/telehealth technologies. This will serve to show the applicability of my theoretical account to concrete settings such as the delivery of health care through hospitals and clinics, and also how the perspective of cognitive-agentic repair might provide useful guidance in thinking through our justification for and development, implementation, and selection of certain health care technologies.

While instances of dispensing medical care and advice at a distance have been observed at least since the early twentieth century (see Fong et al. 2011, 1-2), the past twenty years have been marked by a concerted effort (on the part of national governments, medical specialties, hospital systems, clinics, and patients) to critically evaluate, promote, and utilize a constellation of medical devices and associated practices referred to as "telemedicine" and "telehealth." In its most literal and general meaning, telemedicine is the provision of medical care at a distance. More usefully, though,

[1] A portion of the Veteran Health Administration's definition of its telehealth program (quoted in Darkins et al. 2008, 1120).

telemedicine can be defined as “the use of telecommunications and information technologies to share and to maintain patient health information and to provide clinical care and health education to patients and to professionals when distance separates the participants” (Bauer 2001, 137).[2] As such, telemedicine can involve a wide array of technologies spanning the ordinary (e.g. the personal computer, email, text messaging, and telephone systems) to the more novel and complex (e.g. two-way, audio-visual telecommunication systems that facilitate real-time meetings with a healthcare professional over the Internet; wireless blood pressure monitors, stethoscopes, scales, and glucose monitors that transmit data to central databases for analysis and monitoring; location sensors that monitor the movements and behaviors of patients in their home; and smartphones that employ innovative applications to communicate with and collect data from patients). While many of these technologies focus on the relationship between healthcare professional and patient, some definitions of telehealth are more expansive in their inclusion of online support and discussion groups for patients (such as the medically oriented social network, PatientsLikeMe, http://www.patientslikeme.com, or the Depression and Bi-Polar Support Alliance, http://www.dbsalliance.org) and online health

[2] This definition blurs any distinction between telehealth and telemedicine, which are frequently used as interchangeable terms in the literature. Sometimes, though, telemedicine is distinguished by its focus on the delivery of medical services (such as surgical procedures, diagnosis of a skin condition, or analysis of an x-ray), whereas telehealth focuses on patient education and efforts to promote better self-care. As the functions of telemedicine and telehealth are increasingly consolidated into single devices such as a personal computer or smartphone it will likely become more difficult to meaningfully distinguish these terms, especially from a patient’s perspective. Instead, a better approach may be to adopt an umbrella term such as “connected health,” which some have begun to invoke (see Caulfield and Donnelly 2013; Kveder, Coye, and Everett 2014; Barr, McElnay, and Hughes 2012). However, “connected health” also competes with another umbrella term, “e-health,” that has been in wide circulation since 2000. E-health is sometimes defined as “…an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies…” (Eysenback 2001).

information resources as forms of telehealth technologies (see Kveder, Coye, Everett 2014; Mayo Clinic Staff 2011). Often a variety of these technologies are deployed together in order to provide sufficient data about the patient, tools for self-management, and robust forms of communication with health care professionals. Increasingly, sophisticated smartphone technologies consolidate several of these technologies in one device (e.g. a photo camera, video camera, two-way video camera, email, text messaging, and various health oriented applications/apps that can receive data from other devices to assemble in an ongoing log that might be shared with a health care professional).[3]

Telemedical technologies can be broadly classified as either synchronous or asynchronous. Synchronous telemedical communications facilitate real-time interactions between both patient and health care professional (e.g. video-conferencing technologies). Asynchronous telemedical communications (sometimes called "store and forward") involve the collection, storage, and transmission of data to another person for assessment at some other time (e.g. email, text messaging, or the transmission of radiological images for evaluation at another hospital or clinic).

Additionally, telemedical technologies can be classified in terms of how they are deployed: either 1) within a network of hospitals and clinics to coordinate and provide specialized medical services and care for each institution's patient population (e.g. teleradiology, telesurgery, and teledermatology services), or 2) in a patient's home. In this chapter, I am focused predominantly on home-based telemedical technologies.

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[3] Sometimes the use of mobile phones for obtaining/coordinating medical care or health information is referred to as mHealth (mobile health).

The Veteran Health Administration's (VHA) telehealth program serves as a particularly good reference case for what home-based telemedicine/telehealth can look like.[4] The VHA health care system consists of a national network of integrated hospitals and clinics (152 hospitals and 882 clinics) that delivers care to 5.6 million veterans annually (Naditz 2008; Darkins et al. 2008). From 2003-2007, the VHA healthcare system implemented a major telehealth program across its network of hospitals, called the Care Coordination/Home Telehealth program (CCHT). In 2012, 119,535 veterans utilized telehealth services, which generated annual savings of $1,999 dollars per patient and allowed thirty-six percent of those patients to live independently in situations where they otherwise would have qualified for long-term residential care (Kveder, Coye, and Everett 2014). When a patient enrolls in the program, a care coordinator assesses the patient's care needs and implements a suitable collection of telemedical technologies in the patient's home. Darkins et al. (2008, 1120), summarize the range of technologies that might be deployed:

> The technology selection in the algorithm includes: videophones, messaging devices, biometric devices, digital cameras, and telemonitoring devices. Messaging devices present disease management protocols (DMPs), which contain text-based questions for patients to answer. These DMPs require responses from patients that help assess their health status and disease self-management capabilities. Biometric devices record and monitor vital sign data. Videophones and video telemonitors support audio–video consultations into [sic] the home that replicate face-to-face examinations.

A care coordinator monitors the stream of patient data coming from various devices, and if a patient is identified as "at risk," then she will work with the patient, typically via

[4] The Veteran Health Administration tends to use the term "telehealth" instead of "telemedicine."

telephone, to help manage his condition (Darkins et al. 2008). Messaging technologies in which the patient is asked a series of questions have been especially effective as they alert care coordinators to adverse symptoms, knowledge deficits, and negative health related behaviors so that they can intervene immediately and avoid hospitalizations (Darkins et al. 2008).

Alongside the CCHT program, the VHA healthcare system has also implemented an innovative web-based, personal health record system called MyHealtheVet (MHV), which integrates a number of telehealth/telemedical functions. Veterans register for access to the MHV system, which they access through a website. To gain the fullest access to the system's features, veterans must further authenticate their identity with the VHA. The MHV system pulls together information that the veteran self-enters and also extracts from the patient's electronic medical record (which is maintained and utilized by health care professionals in the VHA system). With access to MHV, a patient can request prescription refills; review prescription history; search collections of evidence based health information; take online courses to promote mental health; store information about caregivers and providers, health insurance information, health care facilities visited; maintain a health calendar that includes events, appointments, reminders, and to-do lists; as well as create a record of personal and family health history, allergies, immunizations, vital signs, tests, medical events, and maintain food and exercise diaries (Hogan et al. 2011). Additionally, MHV includes a secure messaging service that allows the patient to exchange non-urgent messages with a health care professional. The MHV system also incorporates an option (called "Blue Button") to download or print all or portions of the information in the MHV system to utilize when a patient is at the hospital or clinic (Hogan et al. 2011). According to Hogan et al. (2011, S629), 1.2 million users registered with the MHV service as of April 2011.

While technological innovations such as the Internet, broadband data connections, and increasingly ubiquitous mobile phones have undoubtedly fueled the development and use of telemedicine over the past decade, the precarious nature of the United States health care system has also served to bring telemedicine into the spotlight.

- Based on projected rising demand for health care services and the projected supply of doctors graduating from medical schools in the coming years, the Association of American Medical Colleges (see Dill and Salsberg 2008) estimates a shortage of 124,000 full-time doctors, predominantly in primary care, by 2025.[5]
- The Administration on Aging (2014) reports that the number of persons over the age of 65, who often utilize more health care resources, is expected to double by 2050 (currently those 65 and older account for 13% of the population, and in 2030 they will account for 19% of the population). This is fueled by the fact that the 78-million member baby boomer generation began turning 65 in 2011 (IOM 2008). This growth in the elderly population is especially significant because "[m]ore than three-quarters of adults over age 65 suffer from at least one chronic medical condition that requires ongoing care and management" (IOM 2008). Seventy-five percent of health care spending in the United States is related to chronic health conditions (CDC 2009).

[5] There may be similar shortages in the nursing population depending on whether the recent influx of students pursuing careers in nursing continues to increase, hold steady, or decrease (Auerbach, Beurhaus, Staiger 2011).

With increasing longevity, elderly persons will need care and management of their chronic medical conditions for longer periods of time.

- According to the Center for Medicaid and Medicare Services (CMS), health care costs currently account for approximately 17% of the Gross Domestic Product (GDP) and are projected to reach 20% of the GDP by 2022 (CMS 2014). Further, "[h]ealth spending is projected to grow at an average rate of 5.8 percent from 2012 -2022, 1.0 percentage point faster than expected average annual growth in the Gross Domestic Product (GDP)" (CMS 2014). In 2006 in the United States, an average of 7,000 dollars was spent per person on health care, which is "more than twice the average of 29 other developed countries" (CDC 2009). In spite of the amount of money spent on health care, a recent report by the Institute of Medicine (2013) indicates that individuals in the United States have a shorter life expectancy than those in similar high-income countries (e.g. Australia, Canada, France, Japan, etc.), as well as considerably worse health outcomes (e.g. high infant mortality, lower birth weight, higher rates of teen pregnancy and sexually transmitted diseases, higher rates of obesity, greater prevalence rates of diabetes, and higher rates of death from ischemic heart disease).

In short, the US health care system must find ways to provide better quality care at cheaper costs with fewer resources to larger numbers of people. Telemedicine has been proposed as one possible means to address some of the challenges facing the US healthcare system. As a result, home-based telemedicine, and telemedicine more broadly, has generated a sustained and thoughtful discussion about possible cost savings; the provision of medical care to larger groups of people (especially in currently underserved geographic regions [e.g. rural America]); minimizing the number of necessary hospital visits and decreasing the length of hospital stays while improving health outcomes; and a renewed focus on preventative care and patient self-management (see Nesbitt et al. 2006, Bauer 2001; Bradford et al. 2010; Cryer et al. 2012). Far from being an unqualified panacea, though, concerns have also been raised about telemedicine regarding the privacy, ownership and security of data, distribution and access to the technologies amongst different demographic groups, the decontextualization of data, and a diminished doctor-patient relationship (see Wicks et al. 2014; Derse and Miller 2008; Bauer 2001; Fleming et al. 2009; Kaplan and Litewka 2008; Baur 2008; Cornford and Klecun-Dabrowska 2001).

Here I will try to push this conversation forward by using the perspective of cognitive-agentic repair to venture a further argument in favor of the use of telemedical technologies. I will argue that the typical practice of requiring patients to visit the clinic or hospital to discuss treatment options and engage in patient decision-making (without taking compensating measures) sometimes deprives patients of robust cognitive processing architecture that may otherwise be available in their homes. Thus, if health care professionals are not suitably attuned to the often situated nature of human cognition, they can risk doing damage or harm to a patient's cognitive processing and autonomous decision-making capabilities when they attempt to elicit decisions from patients without important technologies or arrangements of technologies ready to hand (imagine the action of stealing Otto's memory notebook and asking him to fumble along in making an important decision). Of course, health care professionals are not acting from any kind of malevolent impulse whereby they intentionally deny patients access to important cognitive resources. Instead, the assumption that persons are brainbound thinking things likely leads them to miss the important ways in which cognitive processing sometimes depends on specific extraorganismic resources. Therefore, it is worth observing that the process of eliciting patient decision-making in a hospital or clinical environment does not *necessarily* cause damage or harm. Instead, given a shift in how persons as thinking creatures are imagined, compensating measures could be taken to better facilitate situated cognition in the hospital and clinical environment.[6] This is important since not all patient-decision making can occur in the home. However, some patient decision-making can and should be able to occur in the home or other suitably practiced and familiar environments replete with cognitively and agenticly significant technologies.

Telemedical applications serve to situate health care decision-making amidst cognitively rich and practiced environments and artifacts that contribute to more fully realized autonomous decisions and plans. In this manner, telemedical technologies might be understood either as means to avoid damage to cognitive processing and related agentic skills (serving as a form of cognitive-agentic preservation/maintenance), or else as means to carry out cognitive-agentic repair by fitting patient health care decision-making back amidst those technologies and arrangements of technologies that serve to

[6] In future work, I would like to explore how the clinical environment might be better designed to facilitate extended/embedded thought for the purposes of autonomous healthcare decision making.

enable robust thought processes of various sorts. Thus, beyond those arguments that emphasize the potential medical and economic benefits of telemedicine, a new argument that considers the nature of human cognition can and should also be applied to the justification for some types of home-based telemedical services.

Impaired Decision Making

In a health care context, the act of obtaining informed consent for a treatment or procedure or to otherwise share medical information is often taken to be a paradigm instance of making room for and respecting autonomous decision-making. Consider, though, how the informed consent process might change depending on the view of cognition that lurks in the background.

If cognition is conceived as exclusively brainbound, then human reasoning processes and related autonomy competency are highly portable and streamlined, so to speak. That is, the essential processes necessary for making a robust, autonomous decision are lodged within the circuitry of the brain, and therefore wherever the brain goes, so also the possibility of robust autonomous decision-making. Thus, if an individual is alone in a clinic examination room or a doctor's office, his or her personal effects set aside, these are nonetheless suitable conditions for autonomous decision-making because the subsequent informed consent process about some procedure or medication is primarily an exchange of verbal and/or written information between two reasoning brains. That is, the patient will, on this model, hear and/or read the information, introspectively reason through the possible risks and benefits along with personal values, commitments, hopes, and plans, and then respond either verbally or in writing with their consent. The body (aside from the brain) and artifacts are not explicitly regarded as having cognitive significance, and, accordingly, the process of informed consent on this approach does not necessarily make room for or explicitly recruit the body or artifacts in the process of reasoning through options and deciding on a particular treatment or procedure.

If cognition is alternatively conceived of as being situated amidst brain, body, and world (though still organism centered), then human reasoning processes and the practice of autonomous decision-making may be decidedly less portable and streamlined. Instead, to either enact or enact more quickly, accurately, or comprehensively the cognitive processes and agentic skills needed to make an autonomous decision will involve particular configurations of the brain, body, and material artifacts such that a person needs to be enmeshed in a particular environment or otherwise have certain artifacts readily at hand. On this approach, the process of informed consent that deposits a patient alone in an exam room or doctor's office without ready access to certain material artifacts might actually be short-circuiting or diminishing cognitive processes that are necessary to either make an autonomous decision at all or for making better/more autonomous decisions.

For example, we might consider the fictional but plausible case of Randal. Randal is a retired widower who began to notice 2-years ago that he was increasingly having difficulty remembering various information (though not at levels that a doctor would associate with a diagnosis of dementia or Alzheimer's disease; instead, Randal judged himself to simply be more forgetful than his otherwise demanding standards of memory required). To compensate, Randal adopted the regular practice of using a notebook to record important information in a systematic manner. Randal uses the notebook both to more reliably and completely remember significant details about his past life and relationships, as well as task-oriented information that helps him carry out his day to day affairs. Randal also uses the notebook to routinely map out possible courses of action for himself, having found that he can think through situations more comprehensively if he is able to sketch possibilities and alternatives as a series of branching nodes and notes on the paper. Thus, beyond simply a means of retrospective memory, the notebook also serves as a means of analysis and reasoning about what Randal really wants to do, as well as a form of prospective memory (remembering what he wants to accomplish in the future). However, Randal is deeply self-conscious about his use of the notebook, thinking that it conveys to other people that he is unintelligent (a fear that was nurtured by his childhood experience of school in which mental memorization of poems and prose was often held up as the defining trademark of intelligence).

Randal's long-time primary care physician (Dr. Joyce) is familiar with Randal's use of the notebook and often tries to accommodate it by either conducting telephone-based discussions with Randal at home where he can use the notebook without any self-conscious thought, or by inviting Randal to use the notebook in the clinic exam room and taking extra efforts to show Randal that she herself (Dr. Joyce) uses the patient medical record as a form of written memory that also helps her to remember information and analyze/reason through possibilities. However, when Randal needed to meet with a specialist health care provider for a surgical procedure, he was plunged into different circumstances.

The surgeon, who was unfamiliar with Randal and his use of the notebook, only meets with patients to discuss treatment at his office. While Randal sat in a chair in the surgeon's office listening to the surgeon explain the reason for the procedure, possible risks associated with the procedure, and how Randal would need to alter his lifestyle following the procedure, he thought about his notebook in the bag at his feet. Although some part of him wanted, even needed, to grab the notebook and review past information and begin to jot down new information that the surgeon was presenting him with, he just didn't feel comfortable revealing his use of the notebook to this otherwise unknown surgeon who he had only met 10 minutes ago (and who, as luck would have it, reminded him of his 6^{th} grade English teacher who insisted on a precise regimen of poetry memorization and recitation each day of class). When the surgeon finished presenting the information and asked whether Randal had any questions, Randal could not readily think of any and signed the consent form that he was presented with, eager to be done with this meeting. From the surgeon's perspective, Randal, despite his lack of questions, appeared alert, engaged (based on his body language), and free from any obvious stress or duress during the meeting, thus the surgeon had no concerns about Randal's ability to understand the information and sufficiently consent to what the surgeon regarded as a relatively routine procedure. Nonetheless, Randal returned home not completely certain that he really wanted to undergo this procedure; unsure of himself, he passively deferred to the surgeon's expert opinion.

In cases such as Randal's, the consent elicited may either be impoverished because it relied on an impaired reasoning process, or it may simply be artificial if the reasoning process was so impaired by a lack of epistemic, material scaffolding that it could not be performed in a competent fashion. When we assume a strictly brainbound account of cognition, we risk overlooking the ways in which robust thought and decision-making processes can be weakened or thwarted by diminished access to cognitively and agenticly significant artifacts and environments that structure those artifacts, which, in turn, constitutes a form of damage/harm to the thinking subject. Instead, as I have endeavored to show in previous chapters (see Chapter 3), there are good philosophical and empirical supports to regard humans as dependent and situated thinking creatures. We should take seriously the implications of this conception of human persons for how we recognize and understand autonomy inside of medical practice. A process of informed consent (and an overall commitment to the value of autonomous decision-making) that is shaped by an account of situated cognition will be sensitive to the ways in which patients might utilize unique configurations of their brain, body, material artifacts and structuring environments to reason and make autonomous decisions in the fullest sense. It is precisely at this point that we are now positioned to see the valuable role of home-based telemedicine technologies as a means of more effectively eliciting the autonomous decision-making capabilities of the patient.

Situating Health Care Decision-Making in the Home

The foil to the image of a patient alone in a clinic examination room or doctor's office with little or no personal effects available is that of a patient enmeshed within the space and place of their home, well worn with material traces of habits and routines and manifestly organized and arranged to support cognitive processes such as remembering and reasoning. A home, which should not be equated with merely a house, is a practiced place (see de Certeau 1984) consisting in particular arrangements of objects and furniture that are well worn by various familiar processes and procedures that pick up, set beside, push, pull, close, open, lift up, set down, and re-order the material implements of a life (or lives). As Merleau-Ponty remarks, “For me, my apartment is not a series of strongly connected images. It only remains around me as my familiar domain if I still hold ‘in my hands’ or ‘in my legs’ its principal distances and directions, and only if a multitude of intentional threads run out toward it from my body” (|1945| 2012, 131). Lived spaces, such as the home, are felt and maintained in and by the intelligent body that serves as the vital center around which things appear and are related.

Supporting and sustaining these practiced relationships is the important sense of security and protection within the home relative to other persons and the larger world beyond its walls and roof (see Amery 1980, 46-47). In this manner, “home” is a normative concept that expresses an ideal of security and protection. It is the unfortunate reality that the places where people live (houses) are not always reliably secure, and therefore houses can fall short of the ideal that is “home.”

Orienting the secured practice of being at home is a complex web of purposes (e.g. safety, sense of identity, comfort, community, hospitality, and protection), amongst which (given an account of situated cognition) is, sometimes, the effort to create material scaffolding for cognitive processes and agentic skills that enable us to achieve varying degrees of personal autonomy. Homes are not merely storehouses for the relics of a life, but rather can be practiced places that help us to think and make authentic decisions for ourselves (What do I really want to do now? What do I really want to accomplish in the future?).

It is then a function of home-based telemedical systems that they can firmly place/situate some aspects of medical decision-making and chronic disease management back within the home, that is, within a secure and practiced place that sometimes serves as the material scaffolding for a range of cognitive processes utilized for autonomous decision-making. Telemedicine does not simply allow patients and healthcare professionals to communicate about and coordinate medical care at a distance from one another but, rather, it positions people inside of highly particularized environments that have a functional role in the way that they think and carry out decision-making processes. Thus, where decision-making in the clinic can sometimes remove patients from the practiced places of their homes replete with cognitively significant technologies, telemedical technologies are part of the effort to repair that broken relationship between a patient and various objects by putting the patient back into lived relationship with those objects amidst the task of medical decision-making.

Mindful of the nature of repair, though, the goal is not to simply put some object back into hand, but to attend to the relationship of trust/reliance between a person and some object(s) (recall the example of the auto mechanic who takes time to explain to a customer what went wrong with the car, how it was fixed, and what the customer can expect from the car in the future in Chapter 2). Telemedical technologies do not merely re-situate a person amidst a practiced place filled with cognitively significant technologies (akin to simply putting objects back into hand) but, rather, by setting up telemedical technologies that can and are expected to be used again and again, the effort is made to ensure that a patient can reliably count on being able to regularly, perform medical decision-making in the practiced place of his or her home with important technologies readily to hand. Home-based telemedical technologies are not one-off experiences, but rather persistent infrastructure in the home that can ensure the ongoing use of various technologies relative to the task of medical decision-making.

Consider the fictional scenario of Dr. Edwards, who emails Mrs. Smith in her home via the secure messaging capability built into the VHA's MyHealtheVet (MHV) web interface.[7] Dr. Edwards is not simply conversing with Mrs. Smith but, rather, with Mrs. Smith in a home that she has strategically arranged and organized to assist her in her thinking and decision-making processes. Accordingly, when Dr. Edwards converses with Mrs. Smith about the risks and benefits of several possible treatment options for her medical condition, she can ask questions and make decisions by engaging in familiar and practiced cognitive routines that are supported by and realized in conjunction with unique configurations of objects and furniture in her home (e.g. an elaborate note system on her home computer that documents aspects of her disease and experiences with various treatments, located in an office that is filled with carefully selected pictures of family and friends which structure and shape aspects of how she remembers her life narrative while

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[7] An advantage of asynchronous telemedical technologies, such as text or email messaging, is that they can more readily allow a patient to take into hand and utilize a variety of objects for thought in order to form a set of questions and responses before actually needing to respond.

helping to re-affirm especially important aspects of her practical identity, as well as ready access to simple pen and paper that allow her to usefully map out possibilities as she analyzes and reasons through her options).[8]

Given that decisions can be more or less autonomous and consent procedures can elicit varying levels of confidence from a patient, this effort to inform Mrs. Smith inside of a secure and practiced environment that helps her to remember and consider things that she otherwise would not or to engage in thought, self scrutiny, and decision-making processes in a faster, more accurate, and/or more comprehensive manner should be understood as an effort to obtain better informed consent and more authentic and complete autonomous decision-making. Thus, where there has been particular concern about making sure that individuals are sufficiently educated about and consent to the use of telemedical technologies in the home (see Bauer 2001; Fleming et al. 2009), an awareness of the ways in which human cognition often may be extended/embedded across brain, body, and world moves us to also consider the serious possibility that telemedical technologies themselves are an important means to obtaining more informed consent and more autonomous decision-making amidst medical care.

[8] A Pew Research study by Fox and Duggan (2013) reports that of those Americans (7 in 10) that track some health indicator (weight, food, exercise, blood pressure, blood sugar, sleep patterns), 40% of trackers report that tracking their health information has led them to ask the doctor new questions or to get a second opinion, while 34% of trackers said that their data tracking has affected their decision about how to treat an illness or condition. Of those who track health indicators, 50% of trackers utilize paper or a journal/notebook, a digital spreadsheet, a medical device, an app on their phone, or a website, while 44% keep track of information strictly "in their heads." Older individuals were less likely than younger people to keep track of information strictly "in their heads" (44% versus 55% respectively). When individuals are managing two chronic conditions, they are more likely to utilize an external resource (paper, device, app) to track indicators for their conditions as opposed to those with one or no chronic conditions.

Instead of removing Mrs. Smith from the cognitive architecture of her home by requiring her to visit a medical office in-person to discuss treatment options, a home-based telemedical system allows Dr. Edwards to achieve Mrs. Smith's informed consent or refusal inside of a space that affords reliable and familiar access to certain artifacts or arrangements of artifacts that serve to realize various cognitive processes that constitute agentic skills that are utilized in achieving a measure of personal autonomy. In this manner, where patient decision-making has traditionally been elicited in a hospital or clinical setting, telemedical technologies can serve to fit a patient back again into practiced places replete with technologies that either enable autonomous decision making or better forms of autonomous decision-making, and thereby achieve a measure of cognitive-agentic repair.

Someone might object and argue that we don't need telemedical devices in order to acknowledge and make room for situated cognitive processes in health care decision-making. A patient can simply visit a doctor in a clinic or hospital, discuss treatment options, return home to consider the options where he is free to use any number of artifacts for thinking through the decision, and then can return to the clinic/hospital with his final decision. However, this proposal misses the way in which the process of obtaining a patient's informed consent should be a dialog between the health care professional and patient, particularly regarding life altering or risky medical procedures/treatments. As a dialog, the informed consent process would be marked by a more dynamic exchange of information, evaluation of the options, questions, new information, clarification, re-evaluation, new questions, more information, more clarification, and so on. Telemedical technologies can facilitate this dialog by situating the conversation between health care professional and patient in the cognitively rich environment of the home itself instead of insisting that a patient go back and forth repeatedly between the clinic and home, which, ironically, would be likely to increase the risk of getting into a vehicle accident that might cause bodily injury.

Another objection might be that we could simply let people utilize various important technologies (pencils and pads, iPhones, laptops, photo albums, etc.) in the clinical exam room and thereby try to facilitate a certain amount of situated cognition for the purposes of medical decision-making within the clinical setting. I am amenable to this idea, and think that there is interesting work to be done regarding how clinics and hospitals might not only permit more personal belongings/technologies in the exam room, but could and should actually take steps to encourage it. However, even if more of a patient's technologies were allowed and encouraged in the exam room, this will not be equivalent to situating thought in familiar and practiced places, as I demonstrate below.

Shaun Gallagher and Anthony Marcel have done interesting work indicating that individuals with motor impairments will sometimes struggle with an action in an experimental context, but improve in their performance of the same action when that action is part of a pragmatic task or in a social context. As they describe a research subject:

> For example, a woman who had difficulty in grasping, in lifting, and in motor fluency when asked in an experimental [abstract] situation to lift a cylinder of the weight and size of a glass of liquid and to move it toward and away from herself, showed clear improvement in her performance when spontaneously drinking during a meal. This same woman was even more proficient, almost normal, in the very same movements when serving

> cups of tea to guests in her home [a social context], although not when clearing up the cups [a pragmatic or instrumental context]. (Quoted in Gallagher [2003, 422])

While Gallagher puts the emphasis on the social context in helping to facilitate the woman's actions, more broadly we can also see that her actions took shape within the context of a practiced situation (eating a meal) and a practiced environment (serving tea in her home). It is not a matter of simply having access to certain instruments (a tea cup) that facilitates fluid action, but being able to use certain instruments within practiced situations and environments (for example, athletes are skilled with a variety of equipment, but the field/situation of play is often vital to summoning their most skillful performances with that equipment).

The same applies to the use of technologies that we might utilize for situated cognitive processing. While I might be able to utilize a variety of technologies to good effect if I had access to them in the clinic exam room, they would lack a certain familiarity that is made possible when they are otherwise mobilized in the skillful web of practices that is structured and oriented by my home. Telemedical technologies do not merely put people within reach of various important equipment, but rather serve to re-situate people within *practiced* places that facilitate skillful performances with certain equipment.

Two cautions should be made in advancing this type of argument. The first is the sober fact that a house does not make a home, in the sense of a secure and practiced place. The justifiable concerns about abusive or coercive relationships within the confines of a house mean that simply using telemedical devices to coordinate health care at a distance does not necessarily entail more informed consent or more autonomous decision-making. Instead, procedures will need to be developed for assessing the effectiveness of utilizing telemedical devices inside of *particular* private spaces and families that might otherwise undercut the benefits of home-based telemedicine (particularly with respect to personal autonomy). Sometimes it may simply be the case that autonomous decision-making can be better facilitated outside of a person's house and in the clinical setting.

Secondly, while I have been broadly making the case for the use of home-based telemedicine as a means to more effectively elicit autonomous decision-making from patients, the nature of my argument actually refers more specifically to those telemedical technologies that are aimed at communicating with, educating, and empowering patients to better understand and engage with their health care. Schermer (2009) rightly points out that there are some configurations of telemedical technologies that do not aim to empower patients to think or engage in more reflective health care decision-making but, instead, are designed to enforce stricter compliance with a health care professional's instructions from afar (e.g. monitoring mechanisms that determine whether or not a patient has taken prescribed medication). Telemedical technologies that are implemented to more effectively control a patient do not have the kind of autonomy maximizing benefits that I have been focused on in this chapter. Instead, my argument promotes those telemedical technologies that not only acknowledge or make room for the patient as a thinking subject, but actually aim to bolster a patient's thought and decision-making practices regarding her health care by situating more of her health care decision-making in a practiced environment (such as the home) with valuable cognitive resources readily to hand.

Keeping in mind the two cautions I have outlined above, home-based telemedicine can serve as a means to more effectively elicit better informed consent and more authentic and complete autonomous decision-making from patients when we recognize that human cognition at various times and places appears to be situated amidst brain, body, and world in ways that make thinking and decision-making processes decidedly less portable and streamlined. Thus, without denying that there are times when health care professionals will need to meet with patients during an in-person office visit, the force of my argument is to shift from the perception of home-based telemedicine as merely a convenient supplement to the “real work” accomplished in the clinic or hospital, to instead regard home-based telemedicine as equally effective and sometimes more effective than in-person office visits when the specific goal is to engage patients in a reasoning process that results in an informed and autonomous decision about their medical care. While this argument is not decisive in opening the floodgates to the use of telemedicine in the practice of medicine, it nonetheless does push the conversation about telemedicine forward by asking the deeper questions: What kinds of thinking creatures are we, and how does that then govern the technologies we use and the kinds of medical systems that we develop and employ? My argument has been that we are the kinds of *situated* thinking creatures that are uniquely positioned to take advantage of certain kinds of home-based telemedical systems.

Making Telemedical Technologies Reparable

Up until this point, I have acted as though the central cognitive benefit of telemedical technologies is their ability to re-situate people amidst various *other* technologies in the home that serve to scaffold thought processes. However, some telemedical technologies themselves can actually serve to scaffold thought processes related to an individual's health. For example, the VHA's MyHealtheVet (MHV) personal health record system serves to record and store a variety of important information so that a patient need not keep that information exclusively in her biological memory. Additionally, the technology helps patients to assemble data points into meaningful logs and graphs that can be utilized to analyze their health and reason through various courses of treatment and behavior modifications for the purposes of self-management. The MHV service also fosters considerable reflection and planning through features that help users set personal goals, identify strengths and obstacles in achieving those goals, break the goal down into manageable tasks, and to track progress towards achieving the goal. The secure messaging functionality built into the MHV system allows a patient to review parts of a conversation with a health care professional as information stored in the world as opposed to a series of biological memories. In each of these cases, the relationship between patient and technology is not one-directional, but rather is characterized by an ongoing series of feedback and feedforward loops in which a patient constructs, maintains, and repeatedly accesses information in the resource. In various ways, the MHV is a technology that serves to scaffold memory and analytical-reasoning processes for the purposes of health care decision-making and planning.[9]

The medically-oriented social network, PatientsLikeMe, focuses on facilitating interactions with other people suffering from a same or similar disease or condition (e.g. epilepsy, fibromyalgia, Parkinson's disease). PatientsLikeMe users talk about their symptoms in narrative form with one another and also rate the severity of their symptoms on a standardized scale which is then assembled with data from other users to create a visual representation of the symptoms that patients with a particular disease or condition experience and how severe various symptoms are. As Clifford (2012) observes, this combination of visual data and disease narratives gives patients a valuable sense of what it is like to experience various stages of a disease/condition given different courses of treatment. As such, this technology might play an integral role in the agentic skill of imagination whereby a patient might iteratively interact with the information provided on PatientsLikeMe to envision a possible future for himself and consider alternate futures given certain courses of treatment. By repeatedly interacting with the information in technology, a patient need not construct an overly detailed internal mental representation,

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[9] The MHV system is even marketed to veterans with this potential in mind. As one of the VHA's webpages ("Download Your Own VA Medical Records," last modified February 4, 2013) describing the MHV Blue Button technology says:

> Think of all the times you've sat in the doctor's office, trying to remember what year you had surgery or the name of that hard to pronounce prescription you're taking. Or maybe you have difficulty keeping track of your appointments or how stable your blood sugar levels have been lately.
>
> Stay on top of managing your health by using MyHealtheVet's Blue Button feature. It allows you to view, print, or download and store information from your personal health record (PHR). Then everything is all in one place and viewable whenever you need.

but instead can use the accounts and graphs on the PatientsLikeMe website to fill out and extend imagined possibilities for his disease trajectory given certain courses of treatment.

Some telemedical technologies then can serve to extend/embed portions of various cognitive processes that are also utilized in various agentic skills (memory, analytical and reasoning skills, imagination) that are mobilized for autonomous decision-making (particularly medically oriented autonomous decision making). Like any other technology, though, telemedical technologies are vulnerable to various forms of damage, which can, in turn, affect the success of an individual's situated cognitive processing and agentic skills. For example, telemedical technologies such as the MHV system and PatientsLikeMe, as web based services, are especially vulnerable to loss of data, service outages (caused by a failing server or power outage), or service terminations in which a company responsible for a service shuts down. In addition to forms of damage that might afflict a web service, there are other forms of damage that might especially affect the computers and mobile phones used to access and interact with the web services. For example, a computer hard drive or LCD screen might fail, a mobile phone screen might become cracked or the device could be damaged by water. Therefore, telemedical technologies will sometimes need repair, and, as technologies that can serve to scaffold thought processes and agentic skills, they will sometimes specifically need cognitive-agentic repair.

As I argued in Chapter 5, given a prima facie responsibility to engage in cognitive-agentic repair, we should ensure that the technologies in need of repair are in fact capable of being repaired. A number of challenges, though, often hinder or halt the possibility of either repair generally or cognitive-agentic repair specifically, such as the opacity of the technology, obstructive designs, deficient information, lack of attachment to the object, the need for specialist repair work, and the invisibility of the technology in daily use. Therefore, to allow for the possibility of repair and cognitive-agentic repair will involve accounting for and working to overcome these challenges through the processes of designing, implementing, and selecting technologies. In this manner, the commitment to making cognitive-agentic repair possible can serve as a valuable standard by which to shape, guide, and regulate our design, implementation, and selection of technologies. Per the case of telemedical technologies, the need for cognitive-agentic repair can help us to think more extensively about how we design, implement, and select telemedical technologies. Thus, beyond the standards of privacy, safety, ease of use, and cost effectiveness in designing and selecting telemedical technologies, cognitive-agentic repair extends and deepens our repertoire of ethically useful standards.

A lot could be said about how to specifically design, implement, and select telemedical technologies so that they allow for cognitive-agentic repair; here I will only highlight a few major points to give a sense for how things might proceed. Additionally, specific prescriptions will vary with each technology under consideration. For example, designing computers to allow for cognitive-agentic repair will proceed differently than setting up a web service such as the MHV system to allow for a certain measure of cognitive-agentic repair. Since I have already talked some about computers in Chapter 5, here I will focus on a telemedical web service such as the MHV system as an example.

Design

The first area of consideration is the design phase. In Chapter 5, I argued that designers should work to develop technologies that are 1) increasingly transparent to user's understanding, 2) less obstructive to a user's efforts to investigate the damage done and repair a particular part/process, and 3) inviting of skillful interaction so that the technology occupies a visible presence in a space and makes clear the relationship between the user and the technology to others who may be called upon to help in a repair. Major hindrances to repair efforts with a web service such as the MHV system are various forms of data obstructions. For example, 1) it might be impossible or difficult to move data from the service into another similar service (owing to non-standardized data formats), or 2) to export the data for the purposes of maintaining a backup copy of the data, or 3) to easily import a backup copy of data back into the system after data has been lost on the service. Therefore, to design this technology to be less obstructive to repair efforts will involve making data more portable (capable of being exported and imported), as well as formatting the data so that it is interoperable with other systems that a user might move to in lieu of the terminated service. These things would be necessary to minimally allow for repair when either some data is either damaged or lost or a web-service shuts down. However, in order to go further and encourage the possibility of repair, efforts should be made to create mechanisms that urge and assist users in creating redundant copies of information (e.g. through reminders to periodically backup data accompanied by easy to understand instructions about how to back up that data) so that if data were lost, a user could put the information back into place (which would be in addition to any efforts a company or organization might take to backup its own servers as part of its commitment to providing a consistent service to users). The MHV system, in fact, has incorporated some of these considerations with its Blue Button feature, which allows a user to download all or part of their MHV records, or to print all or part of their record to use in other settings.

However, a technology can also hinder or halt cognitive-agentic repair if its use is invisible to others who might otherwise play an important role in repairing the technology, and especially fitting it back into a relationship of reliable use. Web services, in particular, have the considerable potential to be invisible technologies. While others might see a person using a computer or mobile phone, they do not necessarily see how that person uses services on the computer or phone. The challenge then is to design telemedical web services for more conspicuous use while nonetheless still maintaining appropriate measures of privacy and confidentiality. Telemedical technologies that serve as communication mechanisms between a health care professional and patient (such as the MHV system with its built in messaging functionality) necessarily exhibit a certain amount of visibility to the health care professional. Were the MHV system to become unusable for some reason, the health care professional who uses the system to communicate with the patient could take steps to assist the patient in setting the technology back in order (which may involve working with specialized technicians to address a particular technology).

There is a difference, though, between knowing that a patient uses some web-service and knowing how they use that web service. A web portal such as the MHV could be designed so that a digital log was automatically and securely maintained regarding what portions of a web service the patient routinely accesses, uses, and updates with information. If/when the technology is damaged, a health care professional could draw on this information to more directly help the individual recover especially important information, put it back into place, and talk with them about what went wrong with the technology and why they can reliably count on the technology again.

The visibility of a telemedical technology need not be limited to a health care professional, though. Services, such the MHV, could be designed so that a patient can invite and allow a family member or in-home care worker to help provide important information in various parts of the record being maintained (such as regarding family or personal medical history). In turn, the family member or care worker would know that a patient utilizes that technology and also something about how he or she uses that technology, which might prompt more substantial conversations about the use of the technology. Importantly, this need not mean that a family member or care worker is given complete access to someone's records. Instead, the value of a web-based service (in contrast to a paper record) is that it can be set up to allow only partial access or even timed access. This would represent an important move beyond treating privacy as an all or nothing endeavor where computer technologies are concerned, and instead would make room for varying levels of privacy and access to information.

In these manners, the technology is made visible to trusted persons who then can serve a role in repairing the technology and a patient's relationship to the technology following some damage. The key is to design technology that gathers people together in its performance.

Implementation

The reparability of a technology, though, depends on more than its initial design. It is also important to consider what other technologies, skills training, information, and tools are implemented along with the technology to ensure its reparability. In Chapter 5, I focused on how a lack of information about how to repair a specific technology (such as modern automobiles and their computer programming) can hinder the work of complete repair. As such, it is important to implement robust information networks alongside various technologies so as to facilitate their reparability. The same applies to telemedical technologies. There needs to be easily accessible and understandable information sources that allow individuals to put a specific technology, such as the MHV web service, back into working order for an individual again. This might involve instruction manuals or how-to videos about how to export and import data from the MHV system, such that if data was lost, either the patient herself or another person could work with her to put things back into order again in such a way that the patient can expect the technology to perform in a reliable manner once again.

However, cognitive-agentic repair does not just target discrete technologies. Sometimes a configuration of several technologies is disordered or damaged. Moreover, in any given case of damage, whether to a single technology or arrangement of technologies, the relationship between a person and the object(s) has likely been impaired insofar as the continued ability to trust or rely on an object to perform in a particular manner has been challenged. Therefore, in additional to discrete technologies, cognitive-repair also targets 1) arrangements of technologies and 2) the specific use-relationship an individual has with any given technology or set of technologies.

Impersonal instruction manuals and how-to videos provided by a company or individual on the Internet will not provide enough information about how to put technologies back into working configurations with one another or into reliable relationship with a particular person. Instead, it will be necessary to gather more specialized information about how objects are arranged in certain spaces and how an individual relates to those various technologies in those spaces. Thus, beyond implementing telemedical technologies alongside traditional information sources (e.g. an instruction manual) that explain how to perform certain repair actions on a discrete telemedical technology, it will also be important to implement telemedical technologies alongside people and/or mechanisms that can collect more specialized information about how a variety of telemedical technologies are arranged and utilized in a specific patient's home. And it will be important to maintain consistent and persistent records of this information for use in cognitive agentic-repairs.

When telemedical technologies are implemented in piecemeal and fragmented fashion such that technologies are introduced gradually over time by a variety of different health care professionals and technicians, it may be that no one has a sufficiently comprehensive view of all the technologies that are in place or how they are being utilized. By contrast, if a patient's telemedical care is assigned to one individual or a team that oversees the implementation of a variety of telemedical technologies and thereafter continues to work with the patient to deliver medical care and promote better self-management of a medical condition, then that care coordinator or team of care coordinators will be positioned to help in collecting and maintaining a consistent and persistent record of specialized information about the arrangement of telemedical technologies in a patient's home and the ways in which he or she uses those technologies. Then, when some telemedical technology or collection of technologies are damaged (e.g. in a flood), the care coordinator will be better equipped to put a patient back into reliable relationship with a specific constellation of telemedical technologies.

The VHA's telehealth program is set up in this latter, centralized manner, which includes assigning a care coordinator to a patient who then helps to select various telemedical technologies and works with the patient to provide ongoing care. This tactic reflects the VHA's more general approach to patient care in which they utilize a "patient aligned care team" (PACT). PACT is based on the older concept of a "medical home," in which a patient's care is overseen by a core set of health care providers who work to coordinate and exchange information amongst themselves and other health care providers who might be recruited to care for a specific patient (see Dickens et al. 1992; Berenson et al. 2008). This is in contrast to the current system most non-veterans experience, whereby individuals receive care from a variety of health care providers who frequently do not know one another or reliably exchange patient information with each other. This latter approach to care is characteristically fragmented. The PACT approach or the medical home model aims to maintain greater continuity of information and care by maintaining a common team of core care providers who work with the patient to navigate and manage a complex system in a well-coordinated and consistent manner.

I highlight this model of the medical home here because it represents one way of creating the kinds of persistent, comprehensive, and specialized information sources about a particular patient and how she uses certain technologies to manage her health and engage in medical decision-making that are necessary for cognitive-agentic repair work. Some version of the medical home should be implemented alongside telemedical technologies, whereby information about the patient is not lost amidst complex, fragmented care systems, but instead a deep and extensive base of specialized information about the patient is maintained and preserved by indexing the patient to a single care provider or team of care providers.

Selection

Even if telemedical technologies are designed to better facilitate cognitive-agentic repair and various forms of information sources/networks (e.g. the patient medical home) are implemented alongside the technologies to provide sufficient information to carry out cognitive-agentic repairs, cognitive-agentic repair will not actually be a possibility in daily life until individuals begin to select and utilize those technologies that allow for or encourage cognitive–agentic repair. Therefore, patients, caregivers, or care coordinators responsible for selecting telemedical technologies should endeavor to select those telemedical technologies that allow for repair generally and cognitive-agentic repair specifically (see my arguments in Chapter 5 for justification of this type of claim). For example, given a choice between using one telemedical web service that allows a patient to import/export data or to move that data to another service as needed and one that does not, individuals should, other things being equal, select the former web service which is more reparable when damage occurs. The defining purchasing/selection question then should not be, "What can this brand new technology give the patient and health care professional?" Instead, the central selection/purchasing question should be "What can this technology, when broken, be made to do again for the patient and health care professional through repair?" In this manner, it is not the advertised functions of a brand new technology that are decisive, but rather its *durable functions*—those functions that can be recovered through repair work—that are decisive for purchasing or selecting a specific technology.

The reparability of any given technology should be assessed by the degree to which it overcomes various challenges to repair generally and cognitive-agentic repair specifically (e.g. challenges of opacity, obstruction, detachment, exclusively specialist repair work, invisibility, and the assumption of exclusively brainbound thought). I outlined a set of questions (in Chapter 5) that might usefully guide the selection of reparable technologies. I repeat those questions here, modified only slightly to reflect their application to telemedical technologies:

1. Are the underlying processes and mechanisms of the telemedical technology or collection of telemedical technologies difficult to examine or understand for those who might need to repair or at least assist in the repair of this technology (e.g. a health care provider, a family caregiver, or friend)? Or, does the technology exhibit a useful degree of transparency to the non-specialist?
2. Is the telemedical technology assembled or otherwise designed in ways that make it difficult or impossible to remove or modify parts (e.g. batteries and screens that are glued in place) or data (e.g. cases of proprietary coding) as needed? Or, do the underlying parts, mechanisms, and processes of a telemedical technology allow or even invite user engagement in the form of repair actions?
3. Does the telemedical technology cultivate a sense of detachment? Or, does the technology nurture forms of attachment either through ease of use, enjoyment, or a stronger cognitive processing relationship?
4. Is there a lack of information about how to repair a specific telemedical technology or a collection of telemedical technologies? Or, is there sufficient information about the telemedical technology/technologies for a non-specialist to carry out or participate in repairs as needed?
5. Is the telemedical technology likely to be invisible amidst day-to-day use? Or, does the telemedical technology invite regular, skillful interaction such that it occupies a visible presence in a space/place?

Conclusion

In this chapter, I have provided an introduction to telemedical technologies and highlighted their significance relative to a health care system that urgently needs to adopt new approaches to medical care in order to ensure a well-functioning and sustainable health care system. I then demonstrated how my framework of cognitive-agentic repair can usefully inform 1) how we might justify the use of telemedical technologies as well as 2) how we should design, implement, and select some telemedical technologies. In this manner, I pushed the conversation around telemedical technologies beyond costs savings, better self-management of chronic conditions, and provision of care to larger numbers of people, and show how the further consideration that humans are dependent and situated thinking creatures can also serve to justify the use of some telemedical technologies. Additionally, knowing that there are a wide variety of telemedical technologies to choose from presently and that there will likely be even more in the future, I have also endeavored to show how the standard of cognitive-agentic repair might usefully help us to design, implement, and select certain technologies while avoiding or rejecting others.

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VITA

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