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The Ethics of Memory Modification

Insights from the Roman Catholic Tradition

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Abstract

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By Phillip Jo

In recent years, memory related technology and research have received growing interest and funding. This technology, however, raises serious ethical considerations that include implications for human identity and the Common Good. This thesis will provide an initial overview of memory in contemporary research and a discussion of important ethical issues in memory modification. Broadening the conversation, I also bring to the fore the relevance of religion and turn to the Roman Catholic Church's bioethical tradition. An exploration of personhood, autonomy, totality, social justice, and non-maleficence paves the way for a constructive analysis of memory modification that parallels certain dimensions of current debates about the ethics of enhancement, neurological death, euthanasia, and genetic engineering.

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Table of Contents

Introduction:

Over the past decade, neurology has captured the fascination of the media, science, and the public. Just this year, Congress has increased the funding of programs supporting research on Alzheimer's Disease by 122 million USD, the Brain Initiative[i] by 40 million, and research on Parkinson's by 16 million USD.[1] There is now almost daily coverage of the brain from a large number of prominent news organization, such as the New York *Times*.[2] This heightened attention and funding has allowed cognitive and neurological research to cast a wide net that encompasses neuroimaging, dementia, psychological disorders, and the ontology of emotion. In addition, memory modification is an exciting new field that has the potential to alter or erase traumatic events in patients with Post-Traumatic Stress Disorder, depression, and schizophrenia as well as increasing the cognitive capabilities of healthy individuals. As a result of recent successes in treating these widely prevalent disorders, universities and governments have created or increased funding in translational neuroscience and memory. For example, Michigan's Grossman Center for Memory Research invested millions in memory technology that will be important for potential modification experiments such as FMRI, cortical cooling, and DBS.[3,]

Memory research is currently profitable, popular, successful, and relevant. However, amidst this rapid growth, there has been a disproportionate lack of [?] ethical discussion of the potential threats and harms of disseminating memory altering drugs and technology. One of the central reasons is the continuing difficulty of unpacking what memory is and how it relates to society.

[i] The Brain Research through Advancing Innovative Neurotechnologies Initiative (BRAIN) is the result of a new presidential platform to innovate neurological research. The goal is to invest in the creation of technologies that give a more dynamic and clearer image of the brain's activity and anatomy.

In chapter one, I provide a summary of the major theories and technologies in modern memory research. This section will further demonstrate that the continuing prevalence of memory modification research requires an immediate and deep conversation of ethics. Chapter two takes up this task, exploring the potential of memory technologies to drastically alter modern conceptualizations of identity, personhood, autonomy, and social institutions.

After this initial background, chapter three addresses the role and relevance of religion, and contends that religion can serve as a productive tool that helps conceptualize suffering, facilitate collaboration, expose assumptions, and act as an entry point for communities to have conversations about ethics. With this foundation, the final chapter analyzes how a particular religious tradition can engage the ethical concerns surrounding memory modification through a values-based approach. Here, I draw upon the rich, bioethical tradition of Roman Catholicism to analyze memory modification through personhood, autonomy, the composite nature of human being, social justice, and non-maleficence. I show how religion can facilitate discussions in bioethics and how religion can unpack the complexities of theoretical technologies with memory modification as a focus.

Chapter 1: The Semantics of Memory

The field of memory is complex, diverse, and rapidly changing. There are dozens of theories, thousands of experiments, and a wide range of technologies in this area. This chapter will attempt to narrow this breadth by focusing specifically on models and techniques that will be relevant in later discussions of ethics.

What is Memory?

We may know the related processes, but no one can definitively define what memory exactly is. One prominent theory in the 20th century compared memory to a basic computer, where a stimulus would trigger a cascade of pre-determined nerve impulses resulting in the formation or recollection of memory.[1] However, from as early as 1986, this idea has been replaced with quantum models that define memory as fluid and continuous with other cognitive processes.[2] Despite advances in our understanding, modern research is still in the preliminary stages of describing and defining memory. Here, I highlight some theories that have attempted to define memory and its processes.

One of the most common and supported models splits memory into two categories: short term and longer term. The former consists of thoughts and sensory information that are immediately being used by the brain.[3] Long term memory is more complex and is created through a three step process. Information from our five senses is first stored in one of the three known categories of sensory memory: iconic (visual), echoic (sound), and haptic (touch).[4] Here, poorly understood mechanisms differentiate between important and nonsensical information. If the mind deems the data important, sensory information is sent to working memory, which "provides temporary storage for information necessary for complex cognitive tasks such as

language comprehension, learning, and reasoning."[5] After the task is completed, the information is erased, returned, or sent to the hippocampus for continued storage and retrieval.

In a groundbreaking paper, Endel Tulvig breaks down long term memory into three parts: procedural, semantic, and episodic.[6] The procedural dimension is responsible for mechanical tasks such as frying an egg or turning on a computer, the semantic deals with meaning and language, and the episodic is related to autobiographical memory.[7] Together they collectively encompass a large part of "knowledge"- or the ideas, experiences, and abilities to function, interact, and understand the physical and cultural rules of the world and society. Advancements in understanding this process have led to significant treatment outcomes. For example, ADHD and Alzheimer's Disease have been associated with defects in working memory that significantly reduce spatial reasoning and information consolidation into long term memory.[8, 9]

The second set of theories involves recollection. A pioneering model – called "mood congruent retrieval" – was introduced in 2000 by Cherry Rusting; it hypothesizes that emotions can consciously or subconsciously elicit memory recall.[10] For example, a warm love song on the radio may evoke memories of a joyous wedding or a first kiss. The processes are not yet fully understood, but a recent study by Steffen Moritz et al. found that depressed patients recall negative memories at higher rates inducing feelings of loss and anger.[11] Another theory of memory retrieval is recapitulation, or the "re-instatement of… patterns… present during [the initial] encoding."[12] This involves a complex dialogue between the three major memory centers of the brain: the hippocampus, cortex, and amygdala. Shared stimuli between a present environment and a memory can trigger the latter's recall. I may remember playing basketball with my father as I walk through the courts of an outdoor playground.

A third major focus of theoretical research is memory consolidation. A breakthrough finding was published by K.S. Choic et al, which states that neurons associated with memory are not confined to a single pathway, but function in quantum or nonlinear systems[ii] that create, store, and distribute entanglement across distant photon channels.[13] More simply, the consolidation of memory is dependent on a wide number of variables, such as the strength and emotional potency of the initial experience.[14]

These theories all point to a common theme: memory is complex and affected by a variety of processes that combines senses, experiences, emotions, facts, and observations "into a fluid narrative of temporal and spatial correlations."[15] In light of this conclusion, theories have attempted to uncover the mechanisms behind memory processes. For example, Perry Thorndyke's research found that individuals better retained narrative experiences that followed a traditional story schema of an introduction, rising action, climax, falling action, and a conclusion than non-narrative experiences.[16] This finding is analogous to how people retell their experiences. Rarely does it read in this way: I went to bed. Before that, I drove home terrified of being fired and spilled coffee on my boss. It usually starts like this: I spilled coffee on my boss and drove home terrified of being fired. Then, I went to bed. In sum, Thorndyke's and similar research attempts to uncover the biological and en-cultured[iii] processes that control how memory constructs narratives in relation to the past, present, and future.

In the end, memory is an interrelated process that cannot be neatly separated from other neurological processes, and is woven together to create intricate narratives. These characteristics of memory have important implications on research and ethics that will be discussed in more

[ii] Linear systems operate in a simple straight line, one output for one input. Quantum systems are more complex and can have multiple sources and outcomes.

[iii] En-culturation is the anthropological concept that includes all the learned worldviews, perspectives, and systems used to deduce, interpret, and participate in social activity and interpretation.

detail in the coming chapters. However, the immediate consequence is that science will have to establish clear links between how memory works with human emotion, cognition, and behavior to prevent these processes. Thus, even if memory alteration becomes feasible, it must also ensure that any memory altering procedure or drug does not damage other important cognitive processes.

Technology in Memory Research

The aforementioned theories have been fueled by functional magnetic imaging, cortical cooling, and deep brain stimulation. These technologies warrant a brief discussion because each one has significant advantages, disadvantages, and concerns that expose the potential dangers of rapidly expanding memory technology and research.

The most commonly used technique is functional magnetic resonance imaging (fMRI), which measures neuronal activity through changes in oxygen and blood flow.[17] In memory, this technology is primarily used to locate what parts of the brain are involved in memory recall, retrieval, and consolidation because fMRIs are radiation free, cost effective and quick, and offer high resolution images.[18] In light of these benefits, fMRI based memory research has been able to correlate behaviors and cognitive processes to specific parts of the brain. For example, scientists have used fMRI scans to differentiate between the maintenance and manipulation of information in working memory.[19]

Thus, the problems with fMRI are not technical, but interpretative. According to Russell Poldrack, the two common misuses of neuroimaging data is reverse and forward inference.[20] The former is when the presence of brain activity is directly related to cognitive function.[21] This reasoning can be fallacious because neurological processes are reliant on multiple centers of the brain that fMRIs can under- or over-represent. Regardless, according to Poldrack, studies still

incorrectly assume that fMRI scans highlight all of the neural activity involved in a mechanism or behavior.[22] For example, if some researchers found that a set of fMRI scans show heightened activity in the hippocampus, they might conclude that the hippocampus primarily controls and stores episodic memory. This statement would be a reverse inference because it incorrectly limits a cognitive function to one neurological region. These misinterpretations of data can be detrimental in light of recent research indicating that almost every type of memory is stored and controlled through multiple areas of the brain.[23] In other words, researchers can only use fMRIs as pieces in solving a greater cognitive puzzle and should be wary of making claims that limit neurological and cognitive function.[24]

Continuing with Poldrack, the second fallacious conclusion is "forward inference" or when the same fMRI scans are used to support two contradicting theories.[25] For example, forward inference of fMRI research has supported two general paradigms of how memory differentiates between objects: single process theory and dual process theory. The former is the proposition that memory classifies objects by varying levels of potency.[26] The latter is the hypothesis that memory separates two objects by recollection and familiarity.[27] The problem is that fMRI scans show evidence for both, but not enough to disprove one or the other, ultimately questioning the validity of these models. Despite these errors, the media portrays fMRI studies as objective and definitive, raising serious concerns about popularizing bad research and false claims.[28] According to an article in *SEED*, media, scientists, grant boards, and the public have used fMRIs to transform subpar research into adequate explanations.[29] For example, a graduate student at Yale, Deena Skolnick, reported in her study that students easily believed "misleading" explanations of psychological phenomenon that incorporated neuroscience.[30] Functional magnetic resonance imaging may be one of the cornerstone technologies of memory research,

but its interpretative flaws should raise some caution, especially when these types of research will have growing influence on the creation of drugs and procedures that could potentially be disseminated widely.

Cortical cooling is another important research method used to localize memory processes in the brain. It involves altering neural tissue and function without making permanent lesions. The dominant methods are cryoloops and cooling plates. The first simply controls the flow of cooled methanol into specific sections of the brain through surgically implanted tubes while the plates use circular dishes to chill nerve tissue. This technology has led to an explosion of research in sensory memory. For example, cortical cooling has identified the importance of the orbital and prefrontal cortex in visual memory and executive effectiveness.[31, 32]

However, there are concerns with this technology. First, recent studies have found that cortical cooling in small lab animals deactivates neuron cells up to 2.55 mm away from the target location.[33] This technology can induce cooling in an unintended area of the brain skewing experimental results. Secondly, this technology has been confined to animal research because it is still unsafe for humans. Critics have, therefore, questioned the validity of translating cortical cooling research in rats to more complex cognitive processes in people. These errors have raised concerns that drugs and treatments developed with this technology could have untested side effects. For example, a 2007 study showed some medication created using cortical cooling research caused dopamine dependent changes that unprecedentedly and significantly affected emotional processing and memory in mice.[34, 35] This research has resulted in the modification and recall of once widely used medical tools such as the Subdural Electrode.[36]

The final technology I will take up here is deep brain stimulation (DBS), which is primarily used to enhance specific areas of the brain involved in memory processing. The

following description is a summary of the procedure taken from MedlinePlus.[37] A surgically embedded pacemaker sends varying degrees of electrical impulses to targeted regions in the brain. The implant has three parts: the implanted pulse generator (IPG), lead, and extension. The IPG generates the electrical impulses and is placed below the clavicle or in the abdomen. The lead is the spiral wire that delivers the shock. The extension connects the IPG with the lead. DBS is mostly used to treat medical disorders, such as seizures in Parkinson's and low brain activity in severe depression. In the past decade, it has been used to re-stimulate or enhance memory in patients with Alzheimer's Disease and has shown how neural misfiring can impede memory functions. [38]

DBS has an innately high risk because it requires an invasive operation. The possible postoperative issues include weight gain, visual loss, dementia, stroke, infection, development of speech impediments, and loss in cognitive functions.[39] The dangers of DBS have received increased attention over the past five years because it will soon be offered as a treatment option for patients with dementia. This decision is based on recent clinical trials that show electrical stimulation in the hippocampus increases neuronal activity and memory in mid-stage Alzheimer's Disease.[40] A second risk is that DBS can potentially alter a patient's personality and behavior, affecting their return to "normal" social environments.[41] Finally, DBS must undergo ongoing trials before it is made available to special groups like children whose anatomically underdeveloped brains require increased surgical precision and accuracy.[42]

These technologies are pivotal in the contemporary revolution of memory research. Without them, cognitive science would have no safe method of obtaining empirical data. The central point of this section, however, is that the primary technologies used in memory research have interpretative or procedural dangers. As a result, although our discussion of memory

modification will focus on individual and social effects, it is important to remember that there are always concerns with the technologies themselves. As we shall see, damage to memory processes has the potential to harm the composite nature of the patient and the Common Good.

Memory through the Ages

Thus far, this chapter has shown how poor understandings of memory and misuse of technology can adversely affect related research. This improper use of cognitive research to make un-reasonable conclusions is not new and has existed throughout history. However, most histories of memory modification focus solely on the theories that have revolutionized cognitive research. Although this paper will include some of them, the main goal of offering background in this next section is to demonstrate how research in memory has a troubled history.

In the 19th century, memory was the cornerstone of the sciences of mental health and was critical in unlocking the mystery of consciousness and the self.[43] There was consequently a fascination with what parts of the brain determined and regulated key cognitive processes. This interest was spurred on by industrial colonialism as the surge of investment in the sciences and the subjugation of "racially inferior" native populations gave scientists a seemingly endless supply of human subjects, who could serve as models for more "superior" human beings.[44]

The actual research conducted on people was diverse and ranged from benign hypnotism to fatal electric shock therapy. The former was considered one of the most effective ways of tapping into the inner consciousness of patients. These studies primarily tested for hyperamnesia (near perfect recall of a memory), memory creation, and insomnia.[45] Other experiments were far more detrimental such as those in which live patients were intentionally given electric treatment and blunt trauma to observe the effects of shock and tissue deformation on cognitive processes.[46]

These experiments started to decline as theories became increasingly developed in the latter half of the 19th century. For example, some of the most prominent advances in memory research was conducted by Henry Holland and William Carpenter. Holland proposed that mental consciousness and memory were related to specific events in a person's life.[47] As a result, the subject's personality and history of his or her experiences became important ways to assess the holistic impact of a memory altering procedures. If Holland outlined the importance of memory and identity, Carpenter was one of the first to examine how emotions and memories acted as automatic responses to certain stimuli.[48] He tested how people recalled events by putting them in familiar situations or eliciting intense emotions of longing or fear. Their insights broadened cognitive and memory research to include social behavior and identity as well as anatomy.

The next great leaps in memory research came in the 20th century through surgical, theoretical, and ethical innovation.

In the early 1900s, Antonio Moniz successfully drilled holes into a patient's skull to remove brain tissue. He called this operation a "leucotomy" and became one of the most disseminated neurosurgeries in the early 20th century.[49] He received the Nobel Prize in Medicine in 1949 for his contributions. The first American leucotomy was done in 1936 by Walter Freeman, who invented the famous "ice pick" lobotomy to quickly access the brain without the need of drilling cranial holes.[50] The operation involved inserting a surgical pick through the ocular cavities of a sedated patient and cutting the orbital bridge and/or parts of the prefrontal lobes. However, the lobotomy could and did hit some of the major memory centers of the brain such as the hippocampus, amygdala, cerebellum, and basal ganglia causing amnesia, hemorrhaging, and sometimes death.[51] These lobotomies provided data for studying how anatomical damage to the brain altered cognitive and memory function, yet at the expense of the

well-being of many human research subjects. Nonetheless, there was a resurgence in cognitive science to locate the major centers involved in memory creation, storage and re-collection.

Alongside this surgical innovation, rapid theoretical development established the field of neuropsychology. In 1930, Sir Frederic Bartlett published a groundbreaking paper on memory retrieval.[52] He concluded that memory retrieval occurred through set neurological "schemas."[53] His method demands a brief explanation. He narrated the Native American tale *War of the Ghosts* to native English speakers. They were then asked to retell the story over the next few weeks. Bartlett noted that the subjects started to replace words in the story with English ones such as "boats" instead of "canoes" and "houses" instead of "teepees".[54] Recollection was thus discovered as an interpretative process that re-shaped the original memory based on previous experience and concepts. These findings were supported by Karl Lashley's research that memory was deeply connected to language, emotion, and sensory information.[55] As a result of these studies, cognitive research made the pivotal theoretical transition from studying memory as static and unchanging to something that was fluid and dynamic. This shift laid the foundations for memory to develop into a separate sub discipline of cognitive studies requiring its own methods, funding, and specialists.

Despite the decline of colonialism and this theoretical development, science still focused on un-ethical anatomical and cognitive studies. According to a Mical Raz's book, *The Lobotomy Letters*, patients who exhibited memory loss after failed operations were rigorously interviewed, tracked, and contained.[56] Outside the U.S., Fueled by World War II and the period's obsession with the neurocognitive sciences, Germany and Japan conducted some of the worst atrocities in modern science. More specifically, Nazis performed live brain dissection to determine racial

differences in anatomy and cognitive ability, inflicted trauma on twins to test telekinesis, and induced altitude sickness to examine neural tissue hemorrhaging and swelling.[57]

This trend of human experimentation led to a deep ethical inquiry that forever changed how memory experimentation was conducted. The first and most obvious is the Nuremberg Code that universally banned human experimentation across all national borders and states.[58] The ten rules noted in the "*The Trials of War Criminals before the Nuremberg Tribunals under Control Council No. 10"* revolutionized research by prioritizing the importance of human consent and safety in all experimentation. This further led to the creation of the Institutional Review Board (IRB) in hospital systems, charged with examining the ethicality of human based biomedical, social, and cognitive research.[59] Many studies were immediately discontinued, grant regulations were rewritten, and nations passed legislation that tightened research oversight. In regards to memory research, the field now had to define the adverse and enduring psychological effects of cognitive study as the definition of trauma was expanded to include mental and behavioral damage. This revolution in research ethics continues to have far reaching influence.

Present Memory Research and a Call for Memory Research Ethics

One of the most rapidly expanding areas of memory research is the modification and enhancement of related processes. As discussed in the next chapter, the potential consequences are complex, enduring, and can drastically alter our perception of self and human communities: Can memory modification drastically alter human behavior by altering an individual's narrative? How can this technology affect an individual's identity? What are the broader social consequences of memory modification? These questions will be answered in detail in the coming chapters.

The point here is that despite these many questions, there is a surprising lack of literature on the ethics of memory modification. In fact, ethicists have just begun to address the sudden and quick rise in memory related research over the past decade. One possible explanation is that memory technology is still perceived to be theoretical and far into the future. This is, however, a misguided belief as contemporary research includes hundreds of experiments that attempt to modify and alter memory related processes. The following section analyzes three experiments that have, to some extent, successfully modified memory and its processes.

The first study was conducted by Steve Ramirez et al., who successfully created a recallable, false memory in rats through manipulating engram[iv] cells in the hippocampus.[60] Various groups of rats were placed in two different environments or contexts. Context A was an empty box, while context B had an electric probe that shocked the rat's feet. The control group only showed fear in context B. However, the experimental group was placed in context B, were given a shock, and had their engram cells altered to remember the experience. These modified rats were then placed in context A. When the researchers activated the modified engram cells, they froze and showed intense fear (shivering and reluctance). The activation of modified cells during the retrieval and recollection of a painful memory caused a conditioned behavioral response despite the absence of the probe.[61] Thus, the researchers were successful in encoding a recallable, "false memory."

The research is not flawless, of course. As with any study using model organisms, translating behavioral and cognitive studies to intricate human processes can be difficult. For example, the study found that memory is temporal and not spatial.[62] This means that altering memory is not about how many cells are affected, but which ones are. In humans, neuropathways can have

[iv] Engrams are the neurons that convert and store memory as biochemical and biophysical changes.

multiple functions making it extremely difficult to isolate what nerve cells are involved in a specific memory process. Thus, research, such as the one mentioned above, will have to be confident that the correct neurons are being studied

However, the Ramirez study still offers a number of key insights into the current state of memory research. First, memory modification does not require next generation technology that can identify and manipulate a specific experience or neuron. The process can be as simple as creating a stimuli induced memory that is recalled in new environments. Second, fake memories can be purposefully created, implanted, and recalled to produce observable behavioral changes. Third, as a result of these two conclusions, the validity of human memory is bought into question because "fake" and "altered" memories can be remembered and induce observable, behavioral response. Therefore, memory modification is a current and emerging field of cognitive study.

Another prominent method of memory alteration is using deep brain stimulation to enhance human episodic memory. In a 2008 study, DBS was administered to treat morbid obesity through hypothalamic[v] stimulation.[63] However, the treatment had the unintended effect of increasing the patient's ability to recall autobiographical memories.[64]After the operation, the researchers administered tests assessing memory processes related to the hippocampus. The general increase in scores were correlated with higher activity of related memory centers through fMRIs and low resolution electromagnetic topology. Other research has also shown that DBS of specific nuclei, such as the subthalamic nucleus, can drastically increase spatial and sequential learning.[65]

The procedure is still too experimental to mass market and clinical studies have just begun. Additionally, the voltages necessary to safely increase memory functions are still largely

[v] The hypothalamus is the region of the brain that controls appetite.

unknown. Regardless, this and similar research has inspired scientists to use DBS in a wide range of applications such as forestalling memory loss in patients with dementia[66] and Alzheimer's Disease or increasing the function of working memory in children with ADHD.[67]

Finally, there is a widely available beta blocker, propranolol, which has the ability to prevent or lower the consolidation of traumatic experiences into long-term memory. The most cited research was done by Roger Pitman et al.[68] They observed Post Traumatic Stress Disorder markers over a one month period between placebo and propranolol groups. The results demonstrate that the drug can either alleviate or prevent PTSD altogether.[69] Of course, the effectiveness of the medication varies according to each patient. Whatever the case, the main point here is that memory altering drugs are readily available in the current market.

These examples demonstrate that memory modification is not futuristic, but emergent. The necessary research, drugs, and technology are currently being developed. However, cognitive science is still very much at the beginning of trying to understand what memory is. A lack of discourse about the potential socio-cultural effects outside of medicine should give us pause, especially in light of contemporary cases where memory based studies have drastically affected the policy, perception, and procedures of prominent institutions. For example, memory research has caused the New Jersey Supreme Court to revise their entire eye witness process after the State vs. Henderson case.[70] The conflict started when a man was shot and killed during a drunken brawl on New Year's Day of 2009. During a suspect lineup, an eyewitness identified an individual, named Larry Henderson, as the perpetrator. Upon review, they found that the witness was high on cocaine during the fight, so was asked to re-identify the suspect in a second line up. The witness continually picked Henderson. Normally this would be used by the prosecution to definitively prove the suspect's involvement. However, the court was presented with reliable

scientific evidence that demonstrated suspect identification through line-ups was not reliable because frequent recollection of a memory reinforces or alters the initial experience. [71] In this case, despite multiple attempts, the witness would continually remember and re-pick the suspect he chose the first time. The pliable quality of memory and the high nature of the witness during the event caused the court to throw out the case. After scientific and internal investigation, the New Jersey Supreme Court ruled that "memory is malleable and that an array of variables can… lead to misidentifications."[72] The court mandated a complete over-haul of the identification by eyewitness.

Although this case focused primarily on the validity of memory, there are hundreds of other questions that need to be answered. If memory enhancement technology was available, should it have been used on the witness? How safe and fair would this technology be? What are the implications of this ruling for prior and previous cases? Can new memory findings create new precedent? The point is that memory research has a broad reach that affects socio-cultural and legal realms.

Another example is the possible abuse of memory altering drugs like propranolol, which is traditionally used to treat Post Traumatic Stress Disorder. Thousands of distributors are willing to offer drugs without a prescription.[73] Already, individuals and companies are attempting to disseminate the drug for profit. Thus, the potential risks and extent of drug abuse should be explored. Otherwise, as discussed in the next chapter, there can be widespread social harm ranging from debilitating addiction, stagnation of social development, proliferation of drug related crimes like rape, and so forth. Ethicists and policy makers will have to evaluate and create proper distribution channels and regulations before memory altering drug are widely disseminated in hospitals and markets.

These are just a number of concerns associated with present memory research. Equal consideration has to be given to potential technology as ever increasing funding makes advancements in memory technology inevitable. In fact, Richard Noorden reports that memory research and funding is expected to double in the next few years.[74] Political officials are also heavily invested because dementia and Alzheimer's Disease cost the nation 159 to 215 billion dollars in 2010.[75] In the future, society may see technologies that can alter or implant specific human memories. The ethical implications of this procedure immediately raise concerns from identity to eugenics, which will be discussed. To avoid unintended harm, ethicists will have to explore the wide spectrum of potential consequences created by advancing memory technology.

Chapter 2: Contemporary Memory Ethics

The call to action that ended the last chapter has been taken up by a small number of bioethicists such as Jeffery Blustein, Evelyn M. Tenenbaum, and the Presidential Council of Bioethics. Out of their scholarship arise, among others, a number of ethical concerns surrounding memory modification, including the loss of episodic memory and its impact on identity (personhood), moral agency, law, and broader society. This chapter gives a brief overview of potential ethical concerns in each of these areas. However, the resulting discussion should be taken into context as there is an intense plurality between how these values are defined across cultures. The following analysis is primarily rooted in Western society drawing upon American and European scholars, legal systems, and sources such as the American Presidential Bioethics Commission. These institutions and individuals are some of the few who have engaged the potential ethics of memory modification.

Identity

One of the most prominent ethical dilemmas surrounding memory technology is the possible alteration or complete loss of episodic memory. Since episodic memory stores the experiences of an individual, the damage to related processes can have large implications to human identity. For the purpose of this thesis, I understand identity as the sum of cognitive processes and memories that contribute to the expression of an individual's personality and/or character.[vi] The phrases "loss of self", "fundamentals of being", and "personhood" all refer to risks or damage that could alter these capacities that affect a person's behavior and ability to

[vi] In psychology there is a notable distinction between "character" and "personality." According to Clarissee, character is permanent, objective, and is a product of the environment while personality is subjective, fluid, and based on social influences (Clarisse. "Differences Between Charcter and Personality." *Differencebetween.com* March 14, 2011.)

engage in social groups. In addition, episodic memory was found to be key in differentiating between objects, languages, people, and ideas.[1] For example, a Democrat at a political convention knows to go to the side with blue signs and donkeys. Once there, he or she can also emulate and expect a certain shared ideology and behavior from recalling prior experiences and political knowledge. However, if I were to remove all of his or her memories pertaining to Democrats and politics, this person would be unable to interpret the meaning behind the associated symbols and social cues. As a result, the creation and expression of human identity is largely dependent on our ability to differentiate, understand, and remember experiences. If these processes are altered, then an individual's sense of self could be drastically transformed. Thus, what is at stake with memory technology is not just physical harm, but the "fundamentals of being."

The President's Council of Bioethics (2003) has been engaged in the debate on how memory modification could directly or indirectly harm individual identity.[2] The landmark case in cognitive psychology that is often referred to here is the 19th century Phineas P. Gage incident, where a young man accidentally had a tampering iron shot through his left eye. He consequently lost large parts of his frontal lobe resulting in amnesia, mania, depression, and increased violence.[3] Although not directly related to memory, the point is that sudden and unprecedented brain damage can lead to psychological trauma. Memory altering drugs may not cause such blunt physical damage, but the indirect harm can be just as severe, especially if memory modification involves tampering with episodic memory that is closely tied to human personality and experience. For example, anti-depressants have been linked to permanent memory loss that has resulted in personality change and impairment of learning and cognitive processes.[4, 5]

According to the Council, the resulting harm can adversely affect an individual's ability to engage in communities, express and sustain an identity, maintain meaningful human relationships, and develop physically or mentally.[6] The complete trajectory of a person's life may be lost, disorienting his or her sense of self; one's personhood becomes threatened. For example, football Hall of Famer Tony Dorsett experienced memory loss due to traumatic encephalopathy, a progressive brain disease.[7] These changes resulted in mood swings and personality changes that have strained relationships with his daughters. Other football players have also shown erratic behavior as a direct result of head trauma that affected memory and other cognitive processes, such as Terry Long who committed suicide by consuming anti-freeze or Justin Strzelczyk who died in a high-speed car chase.[8]

However, Michael Henry critiques the 2003 Presidential Council of Bioethics in his article, "Propranolol and the Prevention of Post-Traumatic Stress Disorder: Is It Wrong to Erase the 'Sting' of Bad Memories?" He argues that the traumatic event itself also alters personality and behavior in the afflicted individual.[9] So, whether it is from propranolol or the initial event, there is always a chance for personality and perception to be changed. The Council's general suspicion about propranolol and other memory interventions does not fully appreciate their potential ability to aid individuals who have gone through intense psychological trauma such as war and rape. Thus, the key would be determining if the resulting restoration of mental stability would outweigh the risks outlined by the Council. Henry contends that this choice should be left to the individual, as the extent of psychological and physical damage is highly variable. If a patient finds living with post-traumatic stress unbearable and is told the full range of risks beforehand, then he or she should be allowed to take the drug. If the same patient feels the risks are too high, then they have the full right to decline treatment and live with PTSD. Thus,

according to Henry, our attention in ethics should not be to ban memory modification but to help the patient make the most informed decision possible. The problem with this conclusion is that, although in line with a contemporary emphasis on autonomy, it fails to address potential social concerns. Ideally, memory modification would stay in controlled environments where it is only administered to inflicted individuals. However, as discussed in chapter one, this type of control is near impossible as memory modification is disseminated to non-afflicted individuals for profit or other types of gain. This, as discussed later, can lead to unforeseen social consequences such as drug addiction and group marginalization.

Another concern surrounding memory modification, identity, and personhood deals with maintaining the developmental integrity of the individual. This simply means that there is a potential concern that the technology could inhibit essential functions important in physical and mental growth. For example, a 2002 study found that "memory also serves the prospective function [of]… plan[ning] future actions."[10] As noted by Herbert Wray, in his article "Imagining the Future Invokes your Memory," the ability to think through, engage, and envision plays a pivotal role in identity.[11] For example, pre-med students are united by their desire of becoming doctors. Their commitment to see this intention through helps them endure past and present academic rigor. Even at Emory University, one can instantly make a friend by complaining about the past horrors of organic chemistry to a science or pre-health major. These memories link the past, present, and future, creating a point of human familiarity and connection. The result is a complex negotiation between prior and later experiences and relationships, where the memory of the former fuels the latter. Thus, a potential concern of memory modification is altering the processes involved in planning and envisioning the future. A person who loses this capability will be less able to develop socially and mentally, fundamentally altering the developmental

trajectory of the individual. On a similar note, the patient's identity and behavior may also be affected. Thus, contemporary memory ethics must consider not just how memory procedures alter identity, but how they adversely affect a person's ongoing cultivation of it.

Memory modification, by its very nature, has the potential to vastly change how individuals and societies behave and interact with one another. Lastly, and most importantly of all, ethicists will continually have to keep in mind that memory modification can alter the immediate and developmental narrative of a person's and society's identity. The stakes are innately high.

Concerns of Agency

Our discussion about identity and personhood leads us to consider important questions regarding agency because choices are ultimately expressions of a person's unique or conditioned will and personality. Respect for agency and autonomy, as Tom Beauchamp and James Childress indicate, requires the recognition of a "person's right to hold views…and to take actions based on personal values and beliefs."[12] This claim applies to situations where memory modification can increase or restrict a person's ability to make conscious choices. The idea implies that memory modification manipulates the connections between memory and agency, restricting or enhancing a behavior or action. However, this section will also discuss "moral agency," which is a person's capacity to make proper moral decisions based on existing beliefs of right and wrong.[13] In other words, memory is an important factor in making choices.

To address the first definition of agency, memory modification can help an individual's ability to make choices by treating debilitating experiences. Many researchers have found that erasing traumatic memories is necessary because retaining trauma can reinforce destructive behavior.[14] Studies have shown that memory processes in the frontal cortex play a pivotal role in

sustaining drug addiction.[15] People who abuse drugs fueled by past memories of highs and withdrawal can relapse or continue illicit drug use. In this case, the individual's experiences and neurochemical changes restrict the agency of the patient by pressuring him or her to continue self-destructive behavior. Memory modification can free these individuals by weakening the patient's long-term memory of drug use, which has been experimentally shown to reduce cravings and relapse.[16] In this case, the agency of the patient is increased by reducing their drug addiction. A hypothetical situation where memory modification could damage a person's agency is if there was an error in the above procedure that enhanced drug related memories. The resulting increase in addiction would diminish a person's agency. The ethical consideration of increasing an individual's ability to choose will largely be dependent on the behavior in question and balancing the success and risk of modifying the memory.

However, ethicists, such as Laura Cabrera, contend that using memory modification to alter these behaviors may give an increased sense of agency, but adversely affect an individual's ability to make good choices. For example, Tobias Brosch's research concludes that memory elicits emotions that shape how an individual makes choices and approaches situations.[17] The study used a game that made participants draw a card from one of four decks. With each pick, they could win or lose money. However, unknown to the subjects, two of the decks were specifically composed to lead to better positive outcomes. Over time, contestants remembered and deduced which decks gave the higher earnings. Those with neurological lesions in parts of the brain important for memory and emotions could not infer this trend and picked from the bad decks over the course of the experiment. In other words, memory and related process are pivotal in a person's ability to learn from situations and continually pick better outcomes. To remove or

alter these experiences and functions could detrimentally affect a person's ability to make better choices.

This discussion leads to concerns of moral agency, which also deals with what choices are actually made. According to Matthew Liao and Andrew Sandberg, memories are pivotal in creating an "appropriate moral reaction."[18] In other words, they serve as cues for "proper" emotional and behavioral responses such as, outliers aside, horror towards murder, theft, and rape. This reaction causes a negative inclination toward that crime and may perpetuate feelings of guilt that engender conciliatory action. The problem, as these two authors point out, is that altering memories can remove or lessen the impact of these responses restricting an individual's moral agency. For example, a criminal may intentionally take propranolol or another drug to weaken emotional function and memory consolidation. A key deterrent of misconduct is removed, allowing him or her to better commit a crime and deal with potential impulses to correct it.[19]

The common theme here is that human agency is largely dependent upon experience and memory. Thus, memory modification directly influences both general and moral agency. Our concern should largely be about qualifying how a memory technology, drug, or procedure actually affects an individual's ability to make proper choices. If these processes are damaged, then the patient can suffer life altering side effects that prevent him or her from making beneficial choices.

Legal Concerns

As I alluded to in the last chapter, the rise of memory technology has pushed legal systems to self-evaluate and modify procedural processes. Adam J Kolber's legal thesis, *Therapeutic Forgetting: The Legal and Ethical Implications of Memory Dampening*, examines

how memory modification can affect existing definitions and procedures of informed consent and obstruction of justice.[20]

Informed consent is important for the bioethical principle of autonomy. It requires healthcare professionals to divulge the relevant risks and benefits of a treatment to a patient. The main legal issue is that the risks associated with memory altering treatments are not completely known. Thus, there are potential legal issues of using memory modification to treat poorly understood disorders such as PTSD. For example, research has shown that the optimal time to administer propranolol is within 6 hours of the event.[21] However, the problem is that "during this period…[researchers] cannot accurately predict whether a given patient will eventually develop PTSD."[22] In essence, a memory-altering drug is being administered not as a treatment but as a preventative measure. The consequent issue is that doctors would have to get informed consent to treat a disorder that they cannot confidently predict will develop. This uncertainty, coupled with the heightened emotional distress of the patient when the consent is requested, brings up serious ethical concerns of disclosure. The main question is whether a patient can comprehend the full risk of this uncertainty in light of their immediate trauma and desire to remove pain.

Despite these concerns, informed consent for propranolol can be legally obtained. Kolber uses the example of a person who is severely injured from a car accident. Even in a state of intense pain and distress, doctors can get a patient's consent to amputate an arm or leg to prevent bleeding and arterial damage.[23] Similarly, the same can be said to ensure the psychological well-being of a patient who does not want to additionally suffer PTSD along with his or her amputation. However, as aforementioned, our poor understanding of the risks of memory modification will require courts to re-address this issue by revisiting informed consent laws that may lead to a more serious consideration of memory in the measure of patient competence.

The second pressing issue that memory modification brings to the fore is the obstruction of legal processes. Obstruction of justice is defined by the Legal Information Institute as any manipulation that prevents or hampers court and legal proceedings such as destruction of evidence and witness tampering.[24] The contention is that memory altering drugs can be used to violate this stature. Hypothetically, a person could give a victim propranolol after the immediate occurrence of a crime or to a potential witness to alter or blunt memories. As aforementioned, this would be perfectly possible in light of research that demonstrates the effectiveness of propranolol in dulling traumatic memory. Even more complicated is if the sole witness wants – for therapeutic reasons – to completely erase his or her memory of a crime. These possibilities have opened up the discussion that a court might mandate a person to preserve his or her experiences regardless of his or her desire to forget them. This presses us to ask whether institutions ought to be allowed to claim ownership over a specific experience in a person's memory. According to Kolber, the general consensus of the courts is that people have the right to their own memories.[25] Regardless, as memory modification becomes a more feasible technology, courts may have to set new legal expectations and legislation that define when and how memory modification might be used without compromising the autonomy, safety, and integrity of individuals and court processes.

These legal changes may have drastic effects on how law is perceived and administered in the future. The possible ramifications for informed consent may also imply more stringent criteria in assessing and disclosing risk in the clinical setting. However, it is important to note that memory ethics is not confined to philosophical arguments of personhood and identity. There are also immediate implications for justice and the law. Thus, as continually emphasized throughout the thesis, the wide reaching effects of memory modification require a constructive

analysis that explores the many potential concerns-both theoretical and practical- from different disciplines.

Memory Modification: A Social Threat?

Memory modification has the *imminent* potential to change societal and individual attitudes and behavior.

Although propranolol misuse is recent and has yet to reach the same level of abuse as other cognitive drugs, the growing prevalence of PTSD, dementia, and Alzheimer's has resulted in a steady rise in propranolol production. The drug is now manufactured by dozens of pharmaceutical companies such as Haihang Industry, Alfa Asear, Bedford Laboratories, Vijay Chemical Cooperation, Rosemont Pharmaceuticals LTD., Tokyo Kasei Kogyo, and Gee Lawson Chemicals LTD. In addition, the use of propranolol has been diversified to treat non-memory related symptoms, which has added to the drug's popularity. For example, according to Ivan Oransky, gymnasts have used propranolol to decrease the negative effects of adrenaline to increase performance like high blood pressure and anxiety.[26] Thus, bioethicists are called to address the potential social harms of disseminating propranolol.

The potential risk of abusing memory-altering drug is similar to what we see with current drugs on the market that treat prevalent disorders (such as psycho-stimulants that increase the attentiveness of ADHD patients or buprinins to treat depression). Over the past few years, ADHD drugs have been illegally sold, prescribed, and taken on college campuses.[27] The concern is that undiagnosed college students use the drug to enhance awareness and concentration while studying or taking exams. This abuse can lead to long term effects such as irregular heart rhythms, sudden death, heart attack, and coma.[28] When buprinins are crushed or injected, they have the same effect as cocaine while being cheaper and more readily available.[29] Some patients

abuse these drugs to extend medicinal effects or sell them for profit. The point is that there is a contemporary trend in using drugs beyond what they have been specifically prescribed for. As mentioned previously, the use of propranolol is being diversified and extended and thus has the ability to be abused in similar ways by a diverse population ranging from actual patients to students.

Another shared risk associated with memory drugs and technology is the concern of access. Already, the United States has one of the most inequitable healthcare systems in the world driven by a widening socioeconomic gap.[30] This again is not uncommon as there are millions of people in this country who live with chronic illness because they are unable to afford proper healthcare. Drugs and procedures to treat disorders such as ADHD and depression are an attempt to restore "normal" cognitive function. However, memory-altering drugs pose unique risks regarding their enhancement capabilities such as increasing memory retention and consolidation. If the procedure is widely commercialized and can only be afforded by the affluent, then social discrimination can occur as the cognitive ability of one group is enhanced and that of the other is not. For example, a wealthy plaintiff may get his memory enhanced using prime technology while a poorer defendant may have to settle for a less effective, court paid procedure. Others may increase their educational and professional capabilities while those who cannot become underrepresented in universities, political bodies, and other institutions. Quite simply, and this will be discussed with greater detail in chapter four, memory modification warrants a deeper exploration of topics such as social marginalization and discrimination.

This chapter has focused primarily on uncovering the current and potential ethical concerns of memory modification. Many of these discussions may portray the associated drugs and technology as something terrible or disastrous. However, propranolol and other memory

interventions can significantly help people who are suffering from debilitating PTSD or other psychological dysfunction. Many would even argue that there is a moral obligation within the medical community to alleviate suffering in any way possible. The problem is that memory modification is complex because memory itself is intricate and variabile. Thus, although the possibilities are exciting, ethicists and health care professionals will have to seriously consider risk caused by memory modification.

Chapter 3: Toward a Dialectic: The Importance of Religious Ethics

To begin, it is important to note that this chapter uses some loaded terms such as "religion" and "secular." These terms require brief explanation because postmodernism has challenged the assumptions and context behind them. Scholars, such as Wilfred Cantwell Smith, have argued that "religion" is a reified term that is rooted in a Western context, which has led to an emphasis on the symbolic and external.[1] The use of this term is thus problematic as it ignores the intense plurality of religious experience and has been used as a means to subjugate other traditions under the Western paradigm. The term "secular" in a political, ethical, and scientific context is usually used as an opposition to "religion" that describes the lack of religious ideologies and paradigms in a given society or institution. However, the actual extent of this binary has also come under question in a postmodern context. If "religion" is reified and highly variable, what is secularism really opposing? Is it possible to completely remove religious influence from a particular ideology or paradigm? The questions surrounding both terms are numerous. However, this section will continue to employ them for three primary reasons. Firstly, there has been no accepted replacement for "religion" or "secular." These terms are widely used in academics and the public sphere making them a practical way to establish some sort of mutual understanding. Secondly, although this paper may refer to "religious" ethics or "secular" ethics, these speak to *categories more than distinct realities*. I acknowledge that these categories are fluid and changing, but to discount them would make ethical discussion near impossible; one needs a linguistic and ideological frame. Finally, they are used by the very academics and ethicists who I engage in this chapter. Semantics aside, I try to resist too much of a generalization – especially in my use of "religion" – when I make specific reference to the Roman Catholic tradition in the final chapter.

These three points bring us to an important conclusion: nowhere does this thesis argue or mean to imply that "religion" or "secular" ethics is the complete owner of an idea or methodology. For example, one does not have to be religious to understand suffering and social marginalization and one does not have to be secular to comprehend the importance of autonomy. This chapter merely addresses a "secular" attitude in bioethics that has the tendency to exclude religion as a relevant partner in public bioethical discourse. In response, traditions and scholars have felt the need to highlight the still important contributions the religions can have in shaping ethical debates.

The relationship between religion and bioethics is longstanding.[vii] At times, the two disciplines did not align. According to Joseph Fletcher's *Morals and Medicine*, this was especially true as individual autonomy was increasingly favored over institutional moral paradigms.[2] Additionally, with the rise of secularism and postmodernist ideals, religious influence has been on the decline.[3] These forces have resulted, according to Robert Wuthnow,[4] in a period of spiritual seeking, where individuals are moving away from singular identities to more fluid and elastic ones. Due to these and other forces, prominent ethicists, like Timothy Murphy, have championed a complete removal of religion from bioethics altogether.[5] He goes on to argue that religion is unproductive as it relies upon imposing tradition- specific dogmas in a continuing trend of secularization.[6] Thus, before I engage Catholic teaching on the uses of memory modification, the relevance of religion in bioethics must be discussed.

[vii] Religion and bioethics have diverse histories depending on the social context, era, and location. This chapter primarily focuses on the development of bioethics in the US. Additionally, the word "religion" is not to generalize or embody the intense plurality of faith in the United States.

Religion and Bioethics

At the dawn of bioethics as a formal academic discipline in the 1960s, religious scholars were some of the first to question how rapidly advancing medical technology could potentially compromise individual wellbeing. For example, Paul Ramsey, in his landmark book, *The Patient as a Person: An Exploration of Medical Ethics,* argued that treating patients as persons raise inevitable concerns about obtaining consent, defining death, and instituting safe practice policies.[7] In the text, he continually drew upon his religious beliefs about protecting the sanctity of life and argues that as long as this value is prioritized, patient harm will naturally be reduced.[8] Cicely Saunders, a founder of the hospice movement, advocated intensely for treating the patient as a "whole person" and was greatly influenced by her experiences with a Holocaust survivor who still intensely adhered to her faith tradition.[9] James M. Gustafson's *Ethics from a Theocentric Perspective* discussed the relationship between theology, anthropocentrism, and a growing social ethic that attempted to create a normative moral standard.[10] Many of these works have become integral parts of contemporary bioethics that emphasizes patient-centered care. Recently, what has been forgotten is not their contributions, but the fact that their scholarship was grounded – first and foremost – in religion. The argument is not whether religion had a hand in the foundation of bioethics, but whether it continues to have anything new or relevant to offer today.

Secularization eventually took bioethics into the social, legal, and scientific realm. The introduction of postmodernism shifted the academic study of religion away from commenting outward on social conditions to an inward pragmatism.[11] This retreat of religion and the separation of Church and state mandated by U.S. constitutional law further amplified the

secularization of bioethics among influential scientific, legal, and political institutions such as the National Institute of Health and the National Science Foundation. This trend supported a general attitude of keeping religion and science separate, which was legitimized by the National Commission for the Protection of Human Subjects (1974) and the Presidents Commission on Bioethics (1979). Both councils were predominantly occupied by scholars of science, law, and philosophy, and, according to Daniel Callahan of the Hastings Center, religion was bypassed altogether.[12]

The result was a schism between secular and religious bioethics that in some ways mirrors the discussion about semantics that opened this chapter. According to Vincent Barry, secular ethics is a "moral philosophy…based solely on human faculties such as logic, reason, or institution while religious ethics are derived from supernatural revelation or guidance."[13] The secular is used in legislation, politics, and science. The religious is employed for the adherents of a tradition.

However, this demarcation has recently been blurred. For example, George W. Bush's Council of Bioethics included the 11th President of the Catholic University of America, Edmund Pellegrino, as one of its two chairs. There was also a greater proportion of humanities-based academics that included philosophers, religious scholars, and so forth. The Council concluded that contemporary bioethics is too heavily "dependent upon the law as the [sole] working source of morality… [where] the language of the courts and legislators becomes the only shared means of discourse."[14] Ethicists, such as Soren Holem, have published in widely circulating journals that outline the necessity of religion in contemporary ethics in light of growing ideological pluralism.[15] Universities across the country are instituting ethics centers that embrace cross-disciplinary collaboration between religion and science. Emory is a prime example, where chairs,

faculty, and affiliates in the Center for Ethics, for instance, include scholars who have drawn upon their religious values to think through ethical dilemmas.

These, among other examples, reflect a general critique of secular exclusivity in determining medical policy and action. The next section offers the rational and moral arguments of religious bioethicists that call for re-assimilating religion into public bioethical discourse.

Religion: A Tool for Bioethicists

Contemporary bioethics does not have to choose between religion and secular paradigms. Even though the latter usually dominates discussions, religion is still a meaningful tool that can be used to work through the intense complexity of modern ethical issues. In order for this constructive discourse to occur, there has to be a willingness to compromise on both sides. Secular bioethics must be willing to seriously engage religion, and religion must accept that religious language may be limiting for broader bioethics conversations. The nature of this dialogue must be reflective and productive instead of defensive; the goal is to demonstrate how a collaborative dialectic can nuance even the most difficult cases and issues in modern bioethics.

According to Carla Messikomer, the first step is to realize that a secular bioethics that draws on an academic moral philosophy is similar to one grounded in religion.[16] In other words, although the sources are different, both fields draw upon a discussion of natural and innate rights that allow the autonomous individual to exercise their moral compass. In addition, the source of these rights are "not only dependent upon 'raw' nature but also upon those artifacts, myths, and…patterns of persistent social arrangements."[17] The argument is that no contemporary ethicist can definitively claim that an issue or value is solely "religious" or "secular." Thus, they can be collaborators in broader bioethics because their ideas, values, and paradigms exist fluidly with one another.

In light of this realization, religious bioethicists have shifted away from solely theocentric, ethical arguments in favor of ones that utilize *values derived from their respective doctrines and beliefs.* This method allows religions to bypass theological language and better communicate with secular ethics.[18] The resulting nuances are thus in a better position to enter the public discourse of bioethics by providing new ways to approach and apply shared, normative moral principles such as, according to the *Belmont Report,* respect for persons, beneficence, and justice.[19] The resulting nuances can be particularly powerful for individuals who consciously or unconsciously share values derived from religious traditions. For example, in Courtney S. Campbell's "Religion and Moral Meaning in Bioethics," he recalls a married couple who gave birth to a terminally ill newborn girl.[20] The doctors suggested she should be immediately hospitalized and would inevitably die in a few weeks. However, the couple refused and raised the child until her death a few months later. Despite the recommendation given by health care professionals, the couple chose an alternative response. As Campbell further states, their belief in "greater powers" urged them to see the suffering of the child not as an inevitable source of pain, but as a trial and a blessing. For them, "religion offer[ed] an interpretation…of reality that [met] the metaphysical needs of the human mind to seek order, coherence, and find meaning in our lives,"[21] an interpretation that secular bioethics could not provide. This example demonstrates "that the tension between religious discourse and bioethics poses dual challenges of accessibility and meaning."[22] The former speaks to the limits of religious relevance in the public discourse of bioethics. However, the resulting neglect of religion means that bioethics will lose the ability to engage the deeper values and meanings of spiritual and professional communities.

According to Campbell, religion can help alleviate this tension by exposing different conceptions of human suffering. Historically, the "Abrahamic traditions" – which is how I will

collectively refer to Judaism, Christianity, and Islam – have dealt and commented on the complexity of human suffering that has included physical hardship, emotional burden, poverty, psychological trauma, forced relocation, and threats to communal and individual identity. Religious traditions consequently offer a rich history that can help contemporary bioethics understand suffering as part of "a journey, [where]…hard cases, quandaries, and dramatic scenarios… [become] a time splice in a narrative of a person's moral quest."[23] This insight reveals why individuals, like the aforementioned parents, would choose to endure the emotional suffering involved in raising a child with a short life expectancy. In other words, religion helps clarify a course of action that many would initially find irrational, silly, and unnecessary. Religions offer different conceptualizations and perspectives of suffering that can help individuals understand and make decisions against existing norms. Campbell summarizes this potential contribution nicely:

> The nature and purpose of life, and the place of health, medicine, suffering, and death within a vision of human nature and destiny, while integral to religious discourse, are common to human questions of meaning that often seem peripheral to the quandary centered concerns of bioethics. A central contribution of religious traditions may therefore be to broaden our moral vision by raising issues of existential interest that are not typically addressed in contemporary ethics.[24]

Religious ethics and discourse can also offer important insight into accessibility and exclusion because of the tradition of empowering and giving voice to marginalized communities. This perspective has developed from a long history of persecution and heightened attention to vulnerability; it can be invaluable in light of contemporary trends in policy and bioethics to cater toward the majority and expand access to existing institutions. As a result, if there is an inherent inequality of access associated with a given healthcare system, the expansion of it will naturally widen disparities. There is always a minority. Unfortunately, on national levels, a minority does

not mean a small number. Consider the forty-six million people who are uninsured in the United States, a number that is still steadily rising.[25] Religion may offer bioethicists strategies that help engage those who are left out of major health policy and decisions. For example, Islamic nations were among the first to set up government-funded, secular hospitals and clinics that could treat at-risk populations without fear of racial, ideological, or religious discrimination.[26]

In addition, bioethicists could draw upon well-known parables such as Jesus curing and restoring ostracized people with leprosy to the community of persons. This case also demonstrates the power and necessity of social healing. Thus, ethics should consider how continual communal support could be extended to patients after hospital care. The main point here is that religion can expose new meanings, definitions, strategies, and approaches that sometimes go unnoticed in contemporary bioethics.

On a similar note, Catholic ethicist Lisa Sowle Cahill argues that religion and theology can identify key assumptions in bioethics because "public discourse is… a meeting ground of the diverse moral traditions that make-up society."[27] Thus, there is no pure, objective stance that can divorce religion and its values from society. This claim can lead to a dangerous situation where the theological and religious assumptions in bioethics go unchallenged. Thus, understanding religion and theology's contribution to modern moral philosophy will be pivotal in uncovering the full spectrum and assumptions behind driving principles in bioethics. In this regard, Cahill refers to how Joseph Cardinal Bernardin's argument for the expansion of fetal rights were well received; his "identity as a religious leader does not disqualify his participation in the public debate."[28] His sermons and ideas attracted religious and non-religious people alike, showing that religious and theologically-derived definitions of life can have secular appeal. In other words,

principles of religious ethics, in this case Catholic notions of life and personhood, still have mass appeal.

Along with these larger theoretical and philosophical claims is the rudimentary argument that many people are still religious. This sentiment is made in the opening of James P. Wind's article, "What Can Religion Offer Bioethics?"[29] He states that to ignore "the 218 denominations, the more than 200 seminaries, the many religion departments in U.S. colleges and universities, and more than 340,000 local congregations that various statisticians monitor…is to engage in a self-deception of monumental proportion."[30] To put his argument in context, this article is about a quarter century old and the state of faith has drastically changed since then. As a result, the sheer number of religious groups does not add to the argument that religious bioethicists are necessary. Membership to a faith does not guarantee these individuals are exact adherents of its principles and values. However, to Wind's credit, his argument is not that "religions exists so their ethics should matter," but more so that religious ethics can facilitate "an honest encounter with religious pluralism, make us more responsive to human particularity, more compassionate, [and] able to offer more complete care."[31] In other words, religious traditions provide a method for bioethicists to face the immense diversity of norms in a given social context. For example, James Wind also contends that religious spaces and institutions can serve as "places of preparation and entry" that enable people to engage modern ethical dilemmas. The influx of new voices, ideas, and perspectives can then help broaden and innovate bioethics.[32] For example, the "Church's Challenge in Health Care," a conference hosted by the Carter Center in 1987, brought together religious leaders who de-emphasized the individual quandaries of contemporary bioethics in favor of broader societal issues such as healthcare access and social responsibility.

Simply, a more balanced discourse can occur by merging concerns of modern bioethics with the broader communal and social issues brought to the fore by religious inquiry.

As these authors demonstrate, the benefits of incorporating religion into contemporary bioethics are broad and multi-faceted. If used in the proper context, religion becomes a powerful tool for ethicists to engage new perspectives, find creative solutions, and uncover the roots of society's values.

However, there are as many practical challenges as there are theoretical. One of them is the vast plurality of religious traditions, which makes incorporating the opinions of every faith nearly impossible. The admittance of some religious ethics automatically implies the exclusion of others. Bioethics will have to determine how to maneuver in this complexity when it comes to drawing up a constructive analysis of an ethical issue. There are some solutions. One requires ethicists to be versed in a multitude of faiths or to, at the very least, have the willingness to engage religion from various perspectives. Scholars of religion can also act as consultants for pastoral committees and attempt to offer as much of an objective opinion as possible. What bioethics cannot do, however, is ignore plurality. To do so is the same as supporting a blanket exclusion of those who actively utilize religion in their daily lives and worldviews as well as abandoning a pivotal tool for inquiry. This ignorance can further lead to unproductive friction between religious and secular bioethics.

What Religion Can Learn from Bioethics

Similarly, religious ethicists can learn from contemporary bioethics. As discussed by James Wind, the perpetual identity crisis of modern religious communities can be enlightened by continual exposure to quandaries dealing with death and suffering. More specifically, religion may "reorient itself away from some of the fine points, abstractions, and specialized interests that

keep religious journals and graduate schools humming tunes few…of America's religious communities [can] sing."[33] In other words, continual encounter with medical case studies and the everyday situations of adherents could cause a tradition to re-evaluate its theology and practice in the face of changing and diverse realities. There are many examples contemporary examples, such as the Dalai Lama's *Secular Ethics*, that attempts to unite the world under a common ethical code or the "Symposium on Muslim and Secular Ethics" at Duke University that discussed emergent principles in Islam as a result of "secular" ethics.

Along similar lines, religious communities can also use "secular" bioethical theory to become more reflective. Although religious traditions have a deep history, they often have a tendency to retreat into fundamental claims that allow little discourse or negotiation.[34] Medical cases and contemporary bioethics that challenge a faith's perspective on life can facilitate a re-conceptualization of their ultimatums and dogmas. For example, Islam has recently entered bioethics in light of concerns surrounding medical technologies such as genetic engineering, stem cell research, assisted reproductive technologies, and abortion. The resulting conversations have ignited re-interpretations and dialogues around life, the status of women, adultery, dignity, and *fiqh*, or Islamic jurisprudence.

Bioethics can also mend the dichotomies between secularism and religion. For example, religious traditions may realize they can offer something unique and profound to medicine and science facilitating interdisciplinary discussion on a larger scale. This conversation is increasingly more likely as bioethics continues to embrace cross-disciplinary collaboration incorporating philosophy, law, sociology, religion, medicine, and anthropology. Thus, "religious" and "secular" bioethicists can cooperate to create a more holistic language to address the intense plurality of contemporary society.

Chapter 4: The Catholic Church and Memory Modification

Having made a claim for the relevance and significance of religion for bioethics, I turn here to an example of how a specific religious tradition – Roman Catholicism, in this case – might engage the question of memory modification. In particular, I will address issues related to personhood, autonomy, the composite human being (under the auspices of the principle of totality), justice, and non-maleficence.

However, there is an immediate problem. The Abrahamic traditions have not yet offered a thorough ethical analysis of memory-altering technology. Perhaps this is the case because, unlike assisted reproduction or genetic engineering which have made rapid technological strides, memory modification may still seem overly theoretical and not of immediate practical concern. Additionally, religion continues to vie for an equal place at the table where public bioethical discourse happens; it continues to struggle to have an active voice in public bioethics. Here, I engage memory modification by applying established Catholic teaching on issues of enhancement ethics, neurological death, euthanasia, and genetic engineering that have some bearing on the questions of memory modification.

Why Catholicism?

Even though the Abrahamic traditions have little or no discussion on memory ethics, the centrality of the Catholic Magisterium – the Church's teaching office – helps scholars manage the diversity of interpretations surrounding many different ethical issues. As one of the goals of this project is to create an entry point for religion to participate in the conversation around the ethics of memory, access to a centralized doctrine and discussion will be pivotal in ensuring the proper translation of Church principles to memory modification.

The reader should note that my choice to explore Roman Catholicism, however, does not imply that I believe that the moral reasoning of other religious traditions is any less valid. Catholicism has a rich intellectual tradition that spans millennia. The Church embraces a dialectical approach to moral theory and application, which means that there is an ongoing conversation between tradition, scripture, context, and emerging ethical issues.[1] This also means that issues and topics are continually reopened as science and technology continue to progress. This dialogue allows scholars to trace how fundamental principles and normative concepts have been applied to comparable ethical quandaries.

Importantly, as a general method of argumentation, the Church starts with an explanation of the central guidelines involved in their immediate ethical discussion. I attempted to mirror the Church's style of inquiry in the value-based approach I discussed in chapter three, which I believe may reach a wider audience in contemporary bioethics than if the approach was only theological. It is precisely for this reason that Catholic rulings have been adopted and addressed in religious, national, and secular discourses. For example, John Paul II's encyclical, *Evangelium Vitae*, which outlines the inviolability of human life, has been of influence in shaping discussions about capital punishment, contraception, and proliferating pro-life movements in the United States.[2, 3]

Catholic Moral Theology

According to *Veritatis Splendor*, an encyclical letter by John Paul II, one of the pivotal goals of the Magisterium is to address the universal issue of morality.[4] According to the Church, "moral theology" is "a science which accepts and examines Divine Revelation while…responding to the demands of human reason."[5] The *Catechism of the Catholic Church* outlines three sources of this morality, which must be weighed when evaluating ethical issues:

the object, the intention, and the circumstances surrounding an action.[6] These are the Magisterium's guiding method of determining whether an act or, for our purposes, a medical treatment is good or evil. In accordance with the doctrine, the procedure in question must ensure the health and integrity of the individual and must be carried out with a right intention. The circumstances around which the action happens are important and must be taken into account when evaluating the situation at hand. In addition, these three dimensions are co-dependent. For example, a procedure that ensures the physical integrity of the patient can still be evil if the intention is corrupt or self-serving.

The application of this moral theology reveals some obvious nuances in the Church's potential approach to memory modification. First and foremost, the related technology, drug, or procedure must be deemed reasonably safe. However, as discussed later, the extent of this "safety" is a complex discussion in Catholicism that implies maintaining human dignity and the integrity of the composite person. Second, the goal of memory alteration must be to alleviate the painful circumstances of an individual without tampering with identity. From this mandate, we can assume that the Church would deem the use of memory modification to gain social and economic advantage as evil and corrupts the morality of the overall procedure. The circumstances here – including whether memory modification amounts to enhancement or therapy – are important. The Church would consequently take issue if memory alteration carries a high risk of permanently altering cognitive functions important in the maintenance and development of relationships and the self.

In other words, in accordance with the issues mentioned in chapter two, the Church's concern with memory modification will involve identity, autonomy, and broader social threats. The Magisterium addresses these topics it its discussion of personhood, autonomy, the composite

human being, justice, totality, and non-maleficence. However, the Church has yet to provide a formal analysis of memory modification. Here, I extend the Church's teaching on enhancement, brain death, euthanasia, and genetic engineering to the issue at hand.

Personhood in Catholicism

Personhood is a category of moral status.[7] The criteria determining who might be included in this category fall under two ideologies: personalism (functionalism) and physicalism. In bioethics, the former consists of the view that a being has moral status if it has certain cognitive capacities, like rationality and self-consciousness.[8] The latter is defined as the belief that moral status is species-dependent; human personhood begins at conception and remains intact throughout life.[9] As outlined in *Donum Vitae*, the Church's instruction on life and procreation, "the inviolability of the innocent human being's right to life [begins] from the moment of conception until death."[10] As a result, the right to life is extended to the embryo and throughout the entirety of the person's trajectory regardless of mental or physical capacity. Thus, the Magisterium's discussion of personhood is intricately tied to defending and extending human worth and dignity. *Gaudium et Spes,* the pastoral constitution of the Church in the modern world, highlights three sources and characteristics of personhood: dignity, the mystery of man, and vocation.[11] This next section focuses primarily on dignity and vocation as being particularly relevant for our discussion on memory modification.

According to the International Theological Commission, human dignity is grounded in the *imago Dei,* which serves as the basis of inalienable rights.[12] Thus, no one has the authority or moral permissibility to remove from any person basic rights and necessities, such as food, clothing, shelter, and family. In other words, dignity is central to the Catholic understanding of

personhood, and talk of rights and obligations to the individuals and institutions flow from this concept.

Gaudium et Spes also speaks to the vocational, or communal, dimension of personhood. The doctrine contends that people are innately social and living in an interdependent world, where social progress will be continually reliant on creating and maintaining meaningful human relationships.[13] Thus, according to the Church, society's main goal is to be able to respect the dignity of the relationships between and within groups as well as supporting the Common Good, which is defined as "the sum of those conditions of social life which allow groups and their individual members […] access to their own fulfillment."[14] Vocation is the means by which people express, actualize, and extend their innate rights through the creation of meaningful human relationships and communities.

The relationship between dignity and vocation is summarized by Leonardo De Chirico, who states that "the inalienable *dignitas* of the person indicates [people's] supreme value…and the communitarian *vocatio* reflects [the] existential [and] social calling."[15] According to the Catholic Church, this understanding of personhood envisions individuals thriving in social communities and participating in the promotion of the Common Good.

This discussion of dignity also implies preserving the developmental potential of human beings. According to *Gaudium et Spes*, individuals are not stagnant, but are in constant flux.[16] The protection of human dignity consequently implies safeguarding the facilities that allow people to grow physically, spiritually, and mentally.

Dignity and personhood are guiding principles of the Church and are continually a part of its discussion of ethics. In light of our discussion of memory modification, the technology must prove that it does not threaten these dimensions of being human. If it cannot, my contention is

that the Church would most likely rule against interventions of this kind. Thus, the key to understanding the Church's approach to an ethical issue would be assessing how and to what extent a person's dignity is affected.

Freedom and Agency: Humans as Autonomous Beings

In the International Theological Commission's "In Search of a Universal Ethic: A New Look at the Natural Law," the Church "recognizes…and affirms that [people] are relatively autonomous centers in the order of being and acting."[17] Here, autonomy is analogous to the principle that we see in bioethics, which is defined as the capacity to freely choose and express one's will.[18] Catholic teaching suggests that this autonomy can only be understood within a larger relational context and is subject to complex forces that continually influence and alter a person's behavior. Whatever these influences may be, the Church continually emphasizes the importance of allowing an individual to have "free domain over his actions."[19]

In light of contemporary concerns that religion may ultimately restrict this general autonomy, *Gaudium et Spes* extends the principle beyond the individual to include social institutions that have "their own stability, truth, goodness, proper laws, and order."[20] In "Created Things Have a Legitimate Autonomy," John Paul II describes legitimate expressions of human will as recognizing human dependence on God while illegitimate expressions deny this relationship.[21] Accordingly, an autonomy that continues to assert an *independence* from God leads to choices that destroy and damage the will of others. The document uses the example of ecological destruction, where unbalanced and overexpression of illegitimate autonomy fueled by profit and material need destroy the environment that all life depends on.[22]

Another example is offered by Pope Francis in *Evangelii Gaudium*. In this apostolic exhortation, he outright rejects the "exclusive" and "unequal" economy of the world, "which

defends the absolute autonomy of the market place … [while] rejecting the rights of states…to exercise any form of control."[23] The Church sees the market as a global and powerful force that has the ability to limit the agency of individuals and state institutions by forcing them to prioritize profit and material gain. Francis indicates that this can lead to a lack of concern for the poor.[24] The homeless person who dies because of his inability to afford shelter, food, and basic necessities rarely receives attention or aid. The callousness perpetuated by market forces and capitalism counters the Church's preferential option for the poor and vulnerable.[25] Thus, according to this teaching, autonomy becomes a problem when individuals, institutions, and states prioritize "the outward, the immediate, the invisible, the quick, the superficial, and artificial."[26]

In summary, autonomy in the Catholic tradition is an innate part of people, communities, and social institutions. However, this autonomy must acknowledge the greater context of community, the dependence on God, the Common Good, and not harm the agency of others. In any discussion about memory modification, the Church will have to balance autonomy in relation to other important values, some of which we will take up in the next section. The resulting negotiation could lead to a spectrum of decisions that might reject or accept memory modification based on whether it aids or constrains agency.

Humans as Composite Beings (Totality), Justice, and Non-Maleficence

Other relevant normative concepts and principles are totality (based on the idea that humans are composites of body, mind, and soul), justice, and non-maleficence; these three are often integrated in bioethical conversation. A number of these have been highlighted throughout this thesis, so I will only offer a brief explanation for our purposes here.

In *Gaudium et Spes*, the Church makes clear that "the focal point of [its] total presentation will be man himself, whole and entire, body and soul, heart and conscious, mind and will."[27] The Church prioritizes the *whole person* care orientation of human health. This means that the harm of any action or technology is evaluated in terms of the physical, cognitive, and spiritual effects on an individual because a human being is a sum of diverse, but interlinked parts.

The principle of social justice is addressed in the "Catechism of the Catholic Church" and "is linked to the common good and exercise of authority."[28] This conversation addresses the social responsibility of human communities to respect the dignity of people by continually striving towards a state of equality and solidarity. As a result, perpetuating justice must include respecting and protecting the totality of human persons. To do otherwise is to deviate from God's plan and perpetuate a state of social discrimination that harms individual and communal dignity.[29]

Non-maleficence can be summed up as "doing not harm." Since the International Theology Commission describes the need to "identify the concrete requirements of human dignity and safe guard the fundamental [. . .] precepts of the natural law," [30] I talk of non-maleficence here as the intentional harm of an individual's personhood, autonomy, justice, and overall relationship with others and God.

These three interrelated principles are important for our discussion of memory modification. The concept of totality implies that memory technology must not adversely affect the composite nature of the human being. Social justice will address the potential harms and discrimination that can be caused by rampant, private consumption of memory-altering drugs

and procedures such as widening societal disparity. Lastly, the prevention of harm implies that if memory modification has significant risks, it should not be disseminated or used at all.

The following sections analyze how a number of the aforementioned principles and normative concepts are applied to various ethical issues. Using these as a lens for comparison, I identify potential concerns that the Church may have surrounding memory modification.

Distinguishing Between Enhancement and Therapy

The Church makes a clear distinction between using technology to enhance individuals and using technology to treat them. According to the National Catholic Bioethics Center, enhancement "refers to procedures that aim to improve the capabilities of the person."[31] On the other hand, treatment involves the removal of debilitating disease (that adversely affects a person's dignity or life).

There is a general sense of caution in, if not explicit condemnation by, Catholic theologians and bioethicists when it comes to enhancement.[32] This is often seen in discussions about genetic engineering that attempt to create "super humans" or to improve general ability.[33] I will take this up shortly.

This conversation can easily be extended to the context of memory modification. As briefly discussed in chapter two, memory technology, drugs, or procedures can be used to enhance cognitive ability, such as using propranolol to increase memory retention. Memory enhancement includes healthy individuals who seek these treatments with the intention of cognitive improvement. The Church would show little hesitance in rejecting this use of technology, especially if the discussed treatment was still unable to address the potential risks to identity and consciousness. Recall that damages to episodic memory can drastically alter

personality and damage important cognitive processes. These risks could potentially and significantly violate the principles of dignity, the composite human being, and non-maleficence. Further, in accordance with Catholic moral theology, even if the procedure could completely guarantee the safety of an individual, the intention of enhancement corrupts the entire procedure.

However, the situation gets infinitely more complex when using medical technology as treatment. These situations usually involve a patient suffering debilitating or life threatening conditions. As a result, the Church would have to carefully weigh the consequences of denying treatment with the risks of the procedure. In regards to memory modification, these cases would include patients who are suffering from a traumatic memory or psychological disorder such as PTSD or depression. Imagine a victim of rape – suffering from PTSD – who comes in for a procedure that could eliminate invasive memories that are preventing her from maintaining a job and raising her family. Imagine, also, that there is a 20% risk that the patient may experience permanent damage to memory consolidating processes as a result of this procedure. This "side effect" is profound; there is a physical risk as well as the potential to permanently damage the cognitive facilities important for the maintenance and development of her identity. If these changes lead to additional negative personality changes, the procedure would be pointless.

In situations where memory modification is used to restore an individual's capacity or dignity, the risk and benefits will have to be carefully weighed by associated individuals and healthcare professionals. In these situations, I suspect that the Church would have a much more difficult time dismissing memory modification, especially if the overall health of the patient is maintained, the intention is to relieve suffering instead of to enhance, and the immediate circumstances of the patient may be drastically improved. However, this attitude may change if

the risks were higher; how, in the end, do we evaluate risk? Is 20%, as in the case above, too much of one?

The ethics of treatment versus enhancement reveals three key conclusions. First, the Church would have to qualify when memory modification falls under enhancement or therapy. Second, the general intention behind the technology's application will be important. Finally, the Church will continually prioritize preserving the cognitive facilities important for the identity and composite integrity of the patient. If the chance of permanent cognitive damage is too high, the Church will not condone memory modification as treatment even though – I must emphasize here – one does not lose his or her personhood, according to the Church, if cognitive capacities are diminished in any way

From Neurological Death: Memory Modification and Personhood

Recall that memory modification has the inherent possibility to harm episodic memory. The resulting damage could adversely affect the identity of the patient. These concerns are tied to Catholic discussions about personhood as drastic changes to consciousness threaten the full range of human well-being. According to the Catholic tradition, even if the individual's identity might be altered (perhaps in a negative way) by said intervention, his or her personhood would remain intact and, thus, would still be clothed with the same dignity. This does not mean, however, that the Church would be indifferent to whatever modification the patient may seek out.

The Magisterium's discussion of neurological death has deeply engaged questions of human dignity. According to David Albert Jones, there are three central concerns surrounding neurological death: the separation of the body and soul, the radical capacity for sentience, and the removal of vital organs before metaphysical death.[34] The first point of contention stems from

the Church's belief that "the rational or intellectual soul is…[a part]…of the human body."[35] According to the National Catholic Bioethics Center, the irreversible loss of neurological function can be seen as the point of separation between the body and the rational soul (which is how the Church defines death, theologically speaking).[36] The remaining concern, however, outlined by John Paul II, is that science cannot empirically determine a point when the soul is completely separated from the body; it can only identify the biological signs that arise from death.[37] This lack of precision can result in permanent alterations to cognitive, physical, and behavioral function, which are all serious implications under the Catholic understanding of personhood and non-maleficence.

Neurological death is also concerned with preserving the dignity of a patient's body. In 1989, John Paul II addressed the Pontifical Academy of Sciences on the issue of organ transplantation. The general conclusion (which continues to be debated by some Catholic bioethicists) was that organ transplantation following the current standard of neurological death is permissible.[38] In 1995, the *Charter for Health Care Workers* clarified the extent of the Church's endorsement. The document states that when "total cerebral death is verified with certainty […] it is licit to remove organs and also to surrogate organic functions artificially in order to keep the organs alive with a view to a transplant."[39] Along these lines, ethicists, such as Alan Shewmon, have stated that the important question is not defining death but "when organs X, Y, Z can be removed without…hastening death or harming the patient in anyway".[40] The tension between the Church and contemporary ethicists on this point reinforce the concern for bodily integrity. The unacceptable alternative is to use the excuse of eventual death to "kill" the patient to save another.[41]

Another concern is preserving the functions necessary for a patient's mental and physical development. In bioethics, there are two important themes here: radical capacity for sentience and complete brain death. The former is the minimum impairment to rationality needed to declare death.[42] The latter is the complete loss of life sustaining neurological function.[43] From the perspective of the Church, the debate between the two is reliant upon maintaining a fundamental assumption that "all living human beings possess a radical capacity for rationality [rooted in a] share[d] nature… to develop and actualize powers."[44] However, the Magisterium views personhood as innate and irrevocable. The fundamental question for the Church is thus not whether sentience is a criterion for personhood, but what the loss of rationality does to the notion of totality. The Church is consequently more concerned with definitions that use loose measures to determine brain death, which would include patients in the last stages of dementia or in persistent vegetative state (the latter is clouded still by cases where individuals in PVS have awakened from coma).[45] Thus, as mentioned, the Church is attentive to the accuracy of diagnosis, especially as it relates to care of the patient-as-person. This concern is made plain in the ongoing debate among ethicists and scholars of the Magisterium.

Catholic discussions of neurological death reveal key nuances that will be pivotal for the following discussion of personhood and memory modification. First, the person is composite of body, mind, and soul. Thus, during life, damage to one dimension of personhood ultimately amounts to the damage of the whole. Intentionally harming one automatically damages the other. Finally, understanding that an individual's personhood is never lost, the debate over rationality and sentience reveals the importance of respecting a person's innate potential to develop beyond their immediate limitations. As a result, even in cases of partial brain death, the patient's composite worth and ability to recover are not undermined.

The concerns over maintaining the dignity of the body mirrors the ones in the treatment versus enhancement section. Drugs, procedures, and surgeries related to memory modification must divulge all of the immediate and potential physical risks to the patient. The extent and probability of these hazards will greatly influence the Church's deliberations on memory modification for treatment. The points of interest will most certainly include how the interventions affect the composite nature of personhood. If allowed, the proper disclosure of this information will be necessary to ensure the patient and medical professionals have the information to make an informed, complete decision.

Catholic discussion of neurological death hints at how memory technology may potentially harm a person's rational and intellectual capacities. Since episodic memory encompasses the full range of experience that grounds an individual's identity, memory modification can adversely affect spiritual development throughout an individual's life. It is not unreasonable to imagine that an active religious person may become non-religious (and, therefore, apathetic vis-à-vis cultivation of their spirituality) after a memory altering procedure. In a tradition where the "health" of the soul is an integral part of the totality of a human being, this would be problematic, to be sure.

Janet Cromer, in her article, reports on her husband's personality and behavioral changes after a severe stroke that required immediate brain surgery.[46] He was normally cordial and peaceful until operative damage to his amygdala, hippocampus, and frontal and temporal lobes[viii] caused sudden and serious bouts of anger, anxiety, and depression. As a result, Janet's husband became violent and suddenly blamed her and others for his lack of control. This change to his

[viii] The major centers of the brain that control memory and emotion.

personality resulted in "disrupted trust, caused emotional pain, unresolved conflicts, decreased intimacy, and [heightened] risk of injury [or increased risk of violence]."[47]

The behavioral shift of Janet's husband has several implications. First, there was a change in consciousness as his awareness and perception of the world was altered. Second, his personality and behavior were altered and impaired. Lastly, the procedure drastically damaged his ability to maintain and establish new relationships. The first two points reflect the Church's concern over preserving a person's capacities. As a result of the operation and neurological damage, Janet's husband – his identity, as she knew it – was transformed. There was, thus, direct and indirect harm to the accumulation of experiences that left him bereft of his normal, cordial personality in light of an aggressive and violent behavior. These tendencies resulted in an increased risk of physical injury to his family, strangers, himself and healthcare providers. The procedure impaired the patient's ability to engage in relationships, primarily the one with his wife. In the end, what we see here is how a neurological intervention can result in a complete transformation or re-orientation of the human person, which speaks to the Church's concern about totality, justice, identity, and dignity.

Although this case is not directly a result of surgical memory modification, it provides an analogue to examine how the Church might approach the issue. As I explained earlier, this risk of behavioral change is drastically higher for procedures involving an individual's episodic memory. Thus, additional considerations will be necessary. Could we possibly transform an individual's personality or consciousness using memory modification? If so, what then?

Catholic discussions of neurological death reveals how personhood and dignity become important considerations in memory altering procedures. This inquiry raises a host of important questions that the Church and ethicists in general will have to answer. What is the threshold of

harm and benefit necessary to warrant surgical or medicinal modification of episodic memory? How is the body affected before and after the modification? How do changes in consciousness cause indirect or direct bodily harm? How might a person's social life be affected after the procedure? Does memory modification fundamentally alter the developmental trajectory of a person's identity and behavior?

From Euthanasia: The Extent of Autonomy in Memory Modification

Respect for autonomy refers to the respect for an individual's choices and actions based on his or her own beliefs and worldviews.[48] In this most basic sense, the principle – as it is described by Beauchamp and Childress – has much in common with the Catholic interpretation of autonomy although the two prioritize the principle differently. The Catholic understanding places autonomy in the context of personhood, which is best described in relation to community whereas others rank autonomy as a supreme value for the individual. Clearly, the Church understands the importance of relationality and community when it comes to decision making and therefore counters renderings of autonomy that are highly individualistic. One example of where the Church has engaged the concept of autonomy in this way is in the debate about euthanasia. I raise this here to draw out implications for memory research.

An important concern of the Church in addressing euthanasia is determining the extent of individual autonomy. As Axel Liegeois summarizes, "everybody will probably agree that inviolability, autonomy, and care are important values. [Euthanasia] puts the patient's autonomy first [while] the Roman Catholic Church considers inviolability to be an absolute value."[49] This stance is further clarified in the Congregation for the Doctrine of the Faith's publication entitled *Declaration of Euthanasia*. Here, the Church clearly states that the intention to bring about death in order to alleviate suffering is morally illicit.[50] The declaration also explains that euthanasia is

in direct violation of the divine law and the dignity of life; both trump the patient's autonomy to end immediate suffering. As such, the Church teaches that there are limits to autonomy.

However, there has been a growing number of dissenting voices. For example, Ann Neumann, in her article "The Limits of Autonomy: Force-Feeding in Catholic Hospitals and in Prisons," argues the illegitimacy of "ignor[ing] an individual's right to make personal medical treatment decisions through ethical and legal exemptions."[51] This tension demonstrates that defining the extent of autonomy is an ongoing debate in Catholicism. Despite these exceptions, the consensus of Catholic hospitals is to reject euthanasia in accordance with the Church's priority to protect the dignity of life.

Appropriating a limit of autonomy will similarly be pivotal for memory modification because it will determine how far an individual will be able to use related technologies, procedures, and drugs for his or her own means. From our earlier discussion on enhancement and therapy, we know that the Church would deem memory technology illicit and would limit its use for exceptional, therapeutic cases. This general attitude would mean placing an immediate limit on an individual's ability to "privately" enhance cognitive function or intentionally alter human behavior. Although humans may drink coffee, take drugs, and eat supplements to elicit neurochemical changes, memory modification is one of the few possible technologies that can *permanently* alter cognitive function. For example, a person who is tired of being shy and introverted may ask for a modification to episodic memory that increases his or her confidence and extroversion. If a society develops a bias toward a certain behavior or character, these personality "enhancements" can lead to a type of eugenics. This will be discussed in more detail in the next section, but the risks include discrimination and oppression of minority groups and

increasing social disparity. These outcomes ultimately violate the principle of social justice that urges societies to proliferate equality and defend the Common Good.

The more difficult debates will occur in situations where individuals suffering a debilitating psychological trauma request a complete memory wipe or replacement. This is the most analogous situation to euthanasia because, as mentioned, the substitution or removal of identity can be interpreted as a kind of death of a person—at least of the person whose identity was grounded in the set memories being abolished. In light of our discussion, I am convinced that the Church would prohibit an individual from pursuing such a procedure under the claim of protecting the integrity of personhood.

The concerns over autonomy in the euthanasia debate provide a comparison and context to examine how the Catholic Church would approach individual choice in memory modification. At the very least, bioethics will have to re-state or re-evaluate the importance of patient autonomy in relation to other important values. This discussion will naturally spark a debate over what these limits are. Additionally, the Church will have to manage its decision in relation to a contemporary bioethics that values autonomy within the context of relationality and the Common Good. The resulting negotiation will have high stakes in light of memory modification's potential to alter human communities.

From Genetic Engineering: Social Non- Maleficence and Memory Modification

Non-maleficence in the Catholic moral teaching is an enduring commitment to do no harm. Its counterpart – beneficence, the duty to do good – underlies the Catholic natural law tradition. The paper thus far has focused heavily on individual non-maleficence such as protecting patient dignity and limiting autonomy. The goal of this final section is to reference the

Church's commentary on genetic engineering and non-maleficence to engage the potential social threats of memory modification outlined in chapter two.

Among the many issues the Church has against genetic engineering, the potential for state-wide eugenics, discrimination, and other detrimental social consequences are among the highest concerns. Michael J. Sandel's article, "The Case Against Perfection," details some of these harms [52] For example, if individuals are allowed to use genetic enhancement to increase muscle strength, athletes will be pressured to undergo the procedure to compete at an increasingly higher level. Even more drastically, parents may choose to engineer an embryo to create a more "physically capable" person. Individuals who cannot access this technology will continually occupy a "less fit" position. Consequently, this has a number of implications for what we mean by ability versus disability. Society will inevitably end up with more categories to justify prejudice. As a result, under claims of dignity, social justice, and non-maleficence the Church rejects the "notion that tends to promote the *cult of the body*, to sacrifice everything for its sake, to idolize physical perfection and success at sports. By its selective preference of the strong over the weak, such a conception can lead to the perversion of human relationships."[53]

The Church warns that genetic enhancement may lead to the systematic discrimination of the unenhanced. This trend has continually repeated itself throughout human history. In early 19th century America, thirty-one states endorsed eugenics programs that sterilized close to 8,000 poor, African men, women, and children.[54] In Nazi Germany, the myth of Aryan superiority caused the murder of millions of Jews, people with disabilities, the elderly, and children. Sperm banks offer profiles and statistics that allowed individuals to pre-screen and select their desired "candidate." For example, Genius Sperm Banks claims to select donors based not only on appearance, but on intellect and achievement.[55] In other words, some parts of our contemporary

society conceptualize and use genetics as a means to manufacture instead of produce. The former is artificially altering a person's or subject's genetic make-up and the latter is allowing processes, such as birth, to follow its "natural" course. This type of selection can drastically rise if patient autonomy is continually emphasized and genetic engineering becomes safe and affordable.

Benedict XVI addressed these concerns in his presentation to the 15th General Assembly of the Pontifical Academy of Life. He argued that the threat of eugenics exists under "a new mentality…founded on personal desires and individuals rights."[56] The social emphasis on choice is a contemporary force that could potentially drive eugenics-based discrimination. For example, if genetic engineering becomes a social trend, those who cannot partake of the technology may be continually placed in marginalized social conditions. They will then face a decline in their ability to access institutions of care and power. The result can be a social discrimination analogous to the darkest parts of human history.

These threats are in direct violation of the principle of social justice that urges all human communities to continually combat sources of inequality. Genetic engineering and state endorsed eugenics create a situation where this becomes difficult or impossible, which causes societies to regress morally and intellectually. As a result, the Church is wary of any technology that may adversely alter the fabric of society. The general point is that *condoning technologies that allow wide spread cognitive, behavioral, or physical enhancement can inevitably raise the risk of eugenics and other discriminatory practices.* These large-scale social threats can ultimately outweigh the overall benefits of a given technology; even if it offers relief to a suffering population. As a result, the hazardous implementation of emerging medical practices can violate the principles of Church teachings that we have engaged over the course of the thesis.

Simply, memory modification offers a unique situation where the cognitive capabilities of an individual can be enhanced. This enhancement can manifest in diverse ways such as increasing the ability to consolidate memory or intentionally altering identity. Thus, in regards to memory modification, perhaps "the fundamental question is not how to ensure equal access but whether we should aspire to it in the first place."[57]

This last statement invokes the "avoid harm" part of the Catholic principle of non-maleficence. In other words, memory modification's threat to social and individual dignity may be too great. Similar to genetic enhancement, a society that endorses and creates certain ideas about how to modify memory or how memory should be has the perpetual risk of discriminating against the unmodified. The enhanced may have increased cognitive abilities such as higher memory retention, modified personalities that let them excel in a social context, rapid memory recollection, and so forth. With time, this dominant group may intentionally or unintentionally replace the unmodified from seats of power. Even if legal protections were expanded to protect the representation of minorities in companies, universities, and politics, the overall position and ability of these groups would inevitably decline. People in this minority group may have decreasing access to the resources necessary to advance socially, physically, spiritually, or intellectually. There is also the risk of a global chain reaction. If one nation were to widely endorse the technology, other states might feel compelled to follow suit to compete on the international stage.

Clearly, there are a number of potential violations of human dignity, social justice, autonomy, and so forth. Even if memory modification is initially used as a treatment, resulting procedures and drugs could be used for large scale enhancement of cognitive capabilities. For example, over the past few years, medications for Attention Deficient Hyperactivity Disorder

such as Ritalin have been abused by college students to induce highs or increase test performance.[58] In a society where memory modification becomes safe and privatized, the Church may seriously question the overall benefit of the technology in relation to its potential social harms. If the probability of these risks is high and they violate social justice, dignity, autonomy, and so forth, the Church may invoke the principle of non-maleficence to reject the technology.

The goal of this chapter was to demonstrate how a value-based religious ethics can engage in the moral discussions surrounding an emerging technology. In this case, the centralized Magisterium of the Catholic Church allowed this thesis to constructively explore relevant principles and apply them to memory modification.

These nuances can be pivotal in aiding contemporary bioethicists in their understanding of the ethical implications of memory technology. For example, the Church's critique of the 'secular' emphasis on an individualistic conceptualization of patient autonomy brings to the fore an important truth of human identity, relationality, and context. Emphasis on patient autonomy may reveal how a contemporary, capitalistic society can eventually cause detrimental social harm. These perspectives can create a more integrative, interdisciplinary approach that assesses a wider range of ethical concerns in memory modification.

Conclusion: Paving the Way

I started this thesis with an overview of memory modification that drew out a number of important ethical considerations, outlined the importance of religion in bioethics, and concluded with a study of Catholic principles and normative concepts that are relevant for a discussion of the ethics of memory modification.

From this inquiry there are a few important conclusions. First, religion facilitates ethical discourse and innovation by offering an alternative perspective and interpretation of dominant ethical paradigms. As interdisciplinary bioethicists, we are well poised to serve as the bridge between secular and religious ethics. The resulting nuances can expose new concerns and possible revolutions that are attentive to the wellbeing of individuals and the Common Good.

Religious traditions-—like Catholicism—are, and must continue to be, active participants in public bioethics conversations. They can contribute to creating a foundation that is more readily able to handle pluralism and the multiplicity of opinions regarding complex issues, such as memory modification. For example, the demarcation of memory technology as treatment versus enhancement has been shown here to be a morally significant one, especially in the context of social marginalization and discrimination. An alternative ideology that challenges the principle of autonomy may be a pivotal means for affected groups to protest the institutional practices that perpetuate inequality. These types of conversations continually challenge contemporary memory-based bioethics to address the minority.

These discussions can additionally expose the limitations of empirically-based ethics since concepts such as the soul or consciousness are difficult to quantify. If these are left ignored and un-defined, contemporary memory ethics may misinterpret or miss altogether the

significance of such things for identity and behavioral change. Some of these concerns, as highlighted in chapter four, deal with potential harms to the composite nature of personhood.

In turn, bioethics – especially *pluralist* bioethics – can look to religion in order to enter into dialogue with different communities. The understanding of these alternative conceptualizations of values and principles can create a collaborative environment that addresses the many concerns with memory modification. Our previous examples of the Church's engagement with the conceptualization of neurological death and the criteria for organ transplantation demonstrate that religion can (and does) look to science (and other disciplines) for moral deliberation.

The purpose of this thesis was thus not to create a definitive ruling or policy direction, but "pave the way" for Catholicism and other religious traditions to productively engage memory modification. The key, as with any discourse, is to be dialectic and constructive instead of combative and defensive. The resulting dialogue will ensure that aforementioned nuances are efficiently utilized in approaching memory modification and, more generally, will serve as a model for approaching future medical technology.

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