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# The Mind-Body Narrative: The Evolution of Psychoneuroimmunology and Its Implications for Nursing Research and Practice

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THE MIND-BODY NARRATIVE: THE EVOLUTION OF PSYCHONEUROIMMUNOLOGY  
AND ITS IMPLICATIONS FOR NURSING RESEARCH AND PRACTICE

by

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THE MIND-BODY NARRATIVE: THE EVOLUTION OF PSYCHONEUROIMMUNOLOGY  
AND ITS IMPLICATIONS FOR NURSING RESEARCH AND PRACTICE

The historical perception of the relationship between the mind and the body is a rich and complex narrative interwoven with multiple interdisciplinary influences and cultural connections. According to Harrington (2008) in *The Cure Within: A History of Mind-Body Medicine*: “Mind-body medicine—a term that came into common parlance only in the 1990s—is not a single approach to healing, but a recently constructed patchwork of quite distinct narrative traditions” (p. 244). It is through this multifaceted and intricate narrative that psychoneuroimmunology (PNI), a multidisciplinary field encompassing the mind-body spectrum through its focus on the relationship between the nervous, endocrine, and immune systems and their influence on health, was conceived in the 1970s. Compatible with the theoretical values of the profession of nursing begun by Florence Nightingale in the nineteenth century, psychoneuroimmunology has both derived support from nursing research as well as contributed to the advancement of nursing knowledge and practice.

This paper will begin with a detailed exploration of mind-body medicine through a liberal arts theoretical lens, focusing on the unique contributions of philosophy, the social sciences, the natural sciences, theology, and the humanities in the perception of the mind-body connection throughout history. Building upon the liberal arts foundation of the first section, the evolution and formal birth of psychoneuroimmunology will be discussed followed by an examination of the relationship between PNI and nursing research and implications for practice.

### **The Philosophical Perspective**

Philosophy is broadly regarded as a discipline in constant search of knowledge and enlightenment. Prevailing thoughts about the mind-body connection and eventually PNI were

directly influenced by the various philosophical perspectives of the time. Throughout history, the philosophical understanding of the mind and body has fluctuated, influenced *by* as well as *influencing* the social sciences, the natural sciences, theology, and the humanities. Philosophy will be used to construct a foundational timeline highlighting the main theories of the mind-body connection throughout history. Refer to Appendix B Figure B1 throughout for a visual representation of highlighted material from this section.

### **Ancient times: BCE-400**

In ancient times, the overwhelming perspective was interconnectedness of the mind and body, one of holism. This interconnectedness can be seen in a number of different ancient cultures. Over four thousand years ago, Chinese doctors noticed that periods of frustration or mental anguish were generally followed by periods of physical illness (Frankel, Quill, & McDaniel, 2003). To the ancient Greeks, the four humors—black bile, yellow bile, phlegm, and blood—were understood to constitute the body and were believed to be influenced by the four elements of earth, water, air, and fire (Eghigian, 2010). In another variation of the belief in the interconnectedness of mind and body, around the fifth century BCE Greek physician Hippocrates believed that the brain secreted mucus which ran down through the nose to cool the blood; recognizing a connection, Hippocrates preached the need of knowledge of mind and body, both of which were vital for understanding the whole patient (Frankel et al., 2003). Along similar lines, the philosophers Plato and Aristotle respectively understood the psyche (Greek for “soul”) as either the animating force or the physiological workings of the inner organs (Eghigian, 2010).

Ancient times also held a strong philosophy that intimately connected the mind and body with moral understanding. The prevailing belief was that illness or possessions occurred as a consequence of personal or community sins, a psychosomatic manifestation of wrongdoing

whose underlying elements would later resurface in the early twentieth century in the form of psychosomatic medicine.

### **Middle Ages: 400-1400**

The large timespan of the Middle Ages would essentially be a continuation of ancient understandings as holistic perspectives remained relatively unchanged. For instance, the brain was thought to be the “seat of the soul,” a belief that surely implies the realization of some intricate connection between the physical (i.e. the brain) and the metaphysical/psychological (i.e. the soul). Additionally, humoral medicine continued to be practiced with treatments being systemic and thought to impact both mind and body (Eghigian, 2010). Religious beliefs also still strongly resounded during this time, significantly influencing the perception of the mind-body connection.

### **Renaissance: ~1300-1600**

“Renaissance” means “rebirth,” a true sentiment in the context of cultural and societal flourishing and knowledge; however, this period also represented *new* birth and with it a shift from a moral/theological philosophy to a more secular one. The Renaissance was strongly influenced by the Protestant Reformation of the sixteenth century and the Scientific Revolution of the sixteenth and seventeenth centuries. Although historically there had been roots of understanding the mind and body as complementary rather than separate before this time, in the seventeenth century, philosopher and scientist René Descartes declared them to be two unconnected entities. This was a key shift in philosophical thought that would continue to haunt mind-body medicine to its core throughout the next centuries (Harrington, 2008). Descartes declared there to be a “fundamental, unbridgeable chasm between the body and the spirit— between the brain and the mind” (as cited in Frankel et al., 2003, p. 23). The body was matter

which behaved according to physical laws whereas the mind and spirit were immaterial and dimensionless.

Although it remains controversial as to whether Descartes should bear full responsibility for the holistic to dualistic transition of understanding health and physiology, the historical context of the time shows how it became influential and gained supremacy. During the seventeenth century, the Protestant Reformation of the Church was occurring. Many began to protest the influence of the Church in politics; as people began to believe that the church and state should be separate, Descartes extended this thought to the human person—so too should the mind and body be thought of as separate. The physiologic (i.e. secular) laws beginning to be understood by scientists further reinforced this philosophical understanding.

### **Age of Enlightenment: 1700-1800**

The dualistic perspective imparted by Descartes carried on through the Age of the Enlightenment. This era was marked by discovery and questioning, scientific theory and proof. The black and white thinking of the time was reflected in the perception of the body as well. Physiologic laws and science were thought to hold the answers and through the process of rationalization and deduction the body could be understood—albeit separate from the mind. In this mindset, invisible fluids and molecular imbalances were the cause of illness and could be corrected with mesmerism, animal magnetism, and magnetic somnambulism, all of which were employed to help re-establish fluid and molecular balance. This will be discussed further in the natural sciences section.

The French Revolution from 1789-1799 also held a unique philosophical framework. During this time, individual authority and secularism were carefully examined, continuing concepts originating from the Protestant Reformation of the seventeenth century. As the upper

class was threatened, lifestyle and environment as well as stress and strain were re-examined for the first time in centuries as being possible factors in disturbances of health.

### **Industrial Revolution: 1750-1850**

The latter half of the eighteenth century and the first half of the nineteenth century saw the boom of technology and manufacturing of the Industrial Revolution. Not only were the creative minds of inventors turning, the philosophical view of the mind and body also reflected the gears and gadgets of the time and this mechanical view of the world was reflected in the understanding of the human person as well. Philosophically speaking, the body was a machine; if something disrupted it, such as a pathogen, the machine (i.e. the body) broke down and would not function correctly. The dualistic separation of mind and body endured as little attention was given to the influence of the mind, the true master of the machine.

### **Romanticism: 1800-1920**

The nineteenth century saw a re-emergence of holism as many were drawn to a “counter-Enlightenment” revolt against the rationalist and mechanistic thought of the Enlightenment and the Industrial Revolution. Part of this stemmed from the growing sense of distrust and distaste for the physician’s authority over the seemingly submissive patient. Proponents of this philosophical thought argued that the body and especially the mind were more mysterious, fluid, and dynamic than initially perceived by science particularly as interest and understanding of the nervous system grew.

New Thought became a philosophical, theological, and cultural movement during this time, urging the unity of not only moral and secular views but also of mind and body. However, this was not unanimous and a strictly scientific, rational perspective continued to have the upper edge, especially toward the late 1800s and early 1900s.



**Militarism and “Modernism”: Early 1900s-1970s**

A key philosophical perspective of the mind-body connection arising during the late nineteenth/early twentieth century was that offered by Freud and his counterparts. Although his roots were in being a nerve doctor—what would today be known as a neurologist—and looking at hysteria, Freud offered a perspective that spoke of the significance of the repression of psychological events that would eventually manifest physically. Psychosomatic medicine was born out of this viewpoint and sought to holistically integrate the functions of mind and body in health.

With the outbreaks of World War I (1914-1918) and World War II (1939-1945), acknowledging the environmental impact and trauma of war strengthened the psychosomatic perspective, although understanding was mostly based on and limited to scientific, laboratory experimentation. Due to the various peri- and post-wartime cultural and social changes such as men on the battlefield, women transitioning to and from the workforce, and the growth of materialism, the fast-paced life promoted by modern times led to the establishment of the concept of stress. This conception was supported by the recognition of the implications stemming from the reciprocal relationship between the body and the mind. However, as American medicine tried to establish itself as a legitimate profession, scientific understanding and rationale remained a priority often limiting genuinely holistic findings.

**“Post-modernism”: 1970-Present**

The late 1960s and the 1970s were a time of alternative thought, highlighted by social and political activism and reform. This emphasis on de-institutionalization and individualization was not solely directed at political institutions; rather, the medical field also felt its repercussions and complementary and alternative modalities (CAM) of healing and holistic therapies became

popular. Holism was finally acknowledged as having validity and credibility as the connections between the mind and body became better understood and analyzed through technological advancements. This focus on the whole person led science to the discovery of the links between the nervous, endocrine, and immune systems—birthing the field of psychoneuroimmunology—and philosophical appreciation for the complexity of the human person.

### **The Social Science Perspective**

The social sciences offer a careful look into human mind and behavior and greatly contribute to our historical understanding of the mind-body connection and the eventual birth of psychoneuroimmunology as well. Topics that will be explored include hysteria, the evolution of psychosomaticism, implications of war, “nature” and the environment, and psychosomatic medicine’s survival through alternativism. Refer to Appendix B Figure B2 throughout for a visual representation of highlighted material from this section.

#### **Hysteria: 19<sup>th</sup> century-early 20<sup>th</sup> century**

Throughout history, hysteria has remained a highly controversial topic; however, a brief background of this hybrid psychological/physical condition is necessary to understanding the complexity of mind-body medicine. Prior to the twentieth century, it was believed that hysteria—characterized by paralyses, manic symptoms, and motor skill dysfunctions—mainly affected women and could be caused by the displacement of the uterus among other things (Hippocrates, ~400BCE as cited in Eghigian, 2010). However, during the post-Enlightenment and the Industrial Revolution the prevailing thought was that hysteria was a result of nervous system faultiness, which will be discussed more thoroughly in the scientific section.

This perception was challenged in 1884 by Hippolyte Bernheim, who argued that hysteria’s etiology was psychogenic—“psychical and not physical or fluid”—drawing evidence

from the work of a country physician named Ambroise-Auguste Liébeault who since the 1860s had cured peasants with an alternative form of hypnotism in which he locked eyes with his patients and told them to fall asleep; after they had awakened, Liébeault convinced them they had improved and oftentimes they had (Harrington, 2008, p. 58; Frankel et al., 2003).

Bernheim's assertion marked a key turning point as it was the first time a psychological approach reigned over the predominant reductionist medicine of the time. In fact, psychological influence over behavior gained more approval than the nervous system's influence and at the 1901 Neurological Society of Paris, it was declared that hysteria had neither an organic nor a neurological cause (Harrington, 2008).

### **The Evolution of Psychosomaticism**

**The Freudian impact.** Freud's contribution of psychoanalysis in the late nineteenth and early twentieth centuries made arguably one of the greatest impacts on the perception of the mind-body relationship of all time. Although he began his career as a neurologist treating his rich and highly educated hysteric clientele with the accepted nervous system treatments of the day: massage and electrotherapy, Freud soon turned his attention toward hypnosis after attending a lecture by Jean-Martin Charcot in 1886. In 1895 he coauthored the widely known psychoanalytic text *Studies on Hysteria* about Anna O. Freud explained how every time Anna O. was able to have what she called mental "chimney sweeping" and recalled repressed memories and re-experienced their associated feelings, her symptoms disappeared (Harrington, 2008, p. 74-5). From this Freud made the pivotal hypothesis that unconscious memories manifested through bodily symptoms; in other words, if the mind couldn't speak, the body spoke for it in the form of illness. Freud further extended and clarified his hypothesis by stating that the memories were of sexual seduction and early childhood sexual abuse of the clients at the

hands of their fathers; however, after being ridiculed at an 1896 conference, Freud altered his stance and declared that it was not actual sexual encounters but childhood fantasies that the women had repressed through shame and guilt, a position that would be resurrected and criticized in the 1970s by the feminist movement.

In the 1920s Freud expanded his focus from hysteria to anxiety and obsessions (Shorter, 1997). Around this time, several began to question whether or not some chronic disorders such as headaches, ulcers, or asthma might have a similar psychogenic etiology as hysteria as they, too, appeared to shift in intensity in response to psychosocial factors. The word “psychosomatic” had its origins in early nineteenth century romantic literature and philosophy and had broadly referred to mind-body disease interactions; it now came to classify disorders and conditions that appeared to be have neither completely psychological nor completely physical causes.

**European acceptance of psychosomatic medicine.** Germany, Switzerland, and Austria became the forerunners of the first wave of psychosomatic medicine (PSM) and although many entered into the field with a biased neurological mindset, they began to angle toward psychoanalytic, naturopathic, and holistic healing, believing that the rigorous laboratory medicine of the time had lost its focus on what was truly important: the patient. For instance, naturopathologist Ernest Schweningen stated that doctors did not cure patients but rather removed the barriers in the form of *das Es*, or “the It,” that manifested itself through illness and disease and kept patients from curing themselves whereas Georg Groddeck, a protégé of Schweningen, ascertained that illness was a “symbolic language,” reflecting Freud’s hypothesis on the physical manifestations of the psychological (Harrington, 2008). Although originally separate from each other, Freud would eventually incorporate Schweningen and Groddeck’s

concepts into “the Id.” However, just as PSM was beginning to captivate the minds of Europe, the rise of National Socialism in Germany and the outbreak of WWII caused many of the time’s brilliant German and/or Jewish psychoanalysts to take refuge in America and the traditional reductionist and mechanistic medicine of Europe was reinstated.

**The American alternative.** In order to be grounded in the scientific community and as opposed to the European perspective, American PSM sought to determine the relationship between specific diseases and their specific—and often psychogenic—causes. A vast majority of American psychosomatic research centered on personality profiling. For example, H. Flanders Dunbar, a pioneer of American PSM and one of the co-founders of the American Psychosomatic Society’s journal *Psychosomatic Medicine*, published the 1935 article “Emotions and Bodily Change” in which she tried to link specific diseases to specific personality types after interviewing 1300 patients with various chronic disorders. In a 1939 excerpt, Dunbar illuminates some of these profiles:

The accident-prone patient says, “I always have to keep working. I can’t stand around doing nothing. When I get mad, I don’t say anything. I keep it in and do something.”

The hypertensive patient says, “I always have to say ‘yes.’ I don’t know why. I am always furious afterwards”; or “I’m angry but I never like to fight. I don’t know why.

Something must have happened once.” “Argument is my long suit. I could argue all day long.” The asthmatic patient says, “Doctor, it’s terrible; I don’t know what I might do.

I’m constantly on the verge of killing somebody or injuring myself; you’ve got to keep me from it, I’m not responsible for myself.” The arthritic patient says, “Everything I do

hurts, but I have to keep on moving” (p. 21-22).

Over the next four decades, Dunbar's influence would continue as countless other personality profiles would be "discovered" and popularized such as the widely acknowledged and mainstreamed cancer-prone personality. These personalities will be further explored in the section on fine arts and culture.

**Franz Alexander legitimizes PSM.** Hungarian-born psychoanalyst and physician Franz Alexander was also a key contributor to the American psychosomatic movement of the 1940s and 1950s, allowing PSM to enjoy mainstream success (Frankel et al., 2003). A strong advocate for the integration of psychoanalytic thought with the new and growing scientific interest in stress physiology, Alexander hypothesized that there was a correlation between repressed emotions and specific disease states due to chronic stimulation or activation of various organs. With this mindset he widened the scope of PSM by combining both the older psychoanalytic and the newer physiologic concepts, giving PSM credibility as a rigorous and meaningful discipline and shifting the focus back to truly holistic medicine.

With Alexander's blessing, by 1943 it was believed that seven psychosomatic disorders—peptic ulcers, ulcerative colitis, rheumatoid arthritis, neurodermatitis, thyrotoxicosis, essential hypertension, and bronchial asthma—resulted from the mind's (i.e. emotions') influence on the body. With obvious Freudian undertones, peptic ulcers were believed to be caused by dependency and the desire for love—as the stomach and gut were associated with nursing or feeding activities—and bronchial asthma was also indicative of dependency in which wheezing signified "an unconscious infantile cry for the mother" (Harrington, 2008, p. 91). In the 1950s, Alexander's textbook *Psychosomatic Medicine* was published, becoming a standard and tangible American PSM reference.

### **The Implications of War**

The militarism of the early twentieth century in the form of World Wars I and II would provide a unique critique of the general census on the mind-body connection, both shaping and limiting the growth of PSM.

**World War I.** With the truly modern and large-scale warfare of World War I, new symptoms such as sensory disturbances or absences, paralyses, difficulty with speech or motor activities, convulsions, amnesia, and continuous shaking appeared in response to this new kind of war. English physician Charles Myers labeled this symptomology “shell shock,” explaining in February 1915 that the “symptoms have their source in invisible shocks—what were called ‘traumas’—to the nervous system brought about by proximity to artillery explosions,” reflecting the pervasiveness of the neurologically-based understanding of the mind and body that had been sustained since the latter part of the nineteenth century (Harrington, 2008, p. 78).

Although his theory was widely supported, Myers failed to explain how soldiers far from the battlefield began manifesting similar symptoms and opinions circulated ranging from cowardice and pretending on the part of these soldiers to a male form of hysteria (again reflective of the continuing presence of the authority of the nervous system in science during the time). Scotsman W. H. R. Rivers strayed from the predominantly neurological (i.e. biological) stance and implemented Freudian techniques by forcing the soldiers to verbalize and confront their memories; this represented a shift in psychoanalytic techniques as these memories were not sexual in nature. Freud responded by expanding his theory and in 1919 explained the difference between “neuroses of war” and “neuroses of peace,” where the ego is damaged by external violence in the former and sexual matters in the latter (Harrington, 2008, p. 80).

**World War II.** Officially lasting from 1939-1945, World War II was a second period of significant psychological and physical assault to the human person. During this same time, Hans Selye's stress research and the discovery of the general adaptation syndrome (GAS) and implications of the persistent activation of the hypothalamic-pituitary-adrenal (HPA) axis were gaining momentum, playing a significant role in prevailing thoughts (to be discussed in the scientific/biological section). As a result, mostly military studies were conducted on stress during the 1950s and 1960s, and by the 1970s one-third of stress researchers were still based in U.S. military institutions such as the Military Stress Laboratory of the U.S. Army; the Stress Medicine Division of the Naval Health Research Center in San Diego; the Walter Reed Army Institute of Research and the Stress and Hypertension Clinic of the Naval Gun Factory in Washington, D.C.; and the Naval Medical Research Unit in Bethesda, MD. Studying the impact of stress in the military setting proved difficult as the stressor needed to be similar to that of actual combat. One controversial yet influential study was conducted in 1962 in which subjects were unaware of being involved in an experiment; they were isolated and told they would be attacked with artillery, saw smoke and thought their building was in danger of being destroyed by a forest fire, believed they were trapped in an airplane about to make crash landing, isolated in areas they believed had been accidentally exposed to radiation, or were told their own error was to blame for a comrade becoming gravely injured in an unknown underground location (Harrington, 2008). Freud's concept of "war neuroses" again resurfaced and was predominant, stating that soldiers who broke down early on the battlefield had had a pre-existing neurosis before war.



**“Nature” and the Environment’s Role**

Although mostly confined to the laboratory setting, twentieth century military psychosomatic and stress research proved instrumental in that it focused on the connection between health and environmental factors, the next pathway psychosomatic medicine would take. After the end of World War II, studies went from looking at solitary traumas such as battle to more repeated incidences of stress over time. The world became “the laboratory” with the realization that “many conditions of ordinary life—for example, marriage, growing up, facing school exams, and being ill—could produce effects comparable to those of combat” (Lazarus, 1993, p. 2). For instance, the “Social Readjustment Rating Scale” created in 1967 by psychiatrists Thomas H. Holmes and Richard H. Rahe quantified the cumulative effects of stress over a one year period by rank ordering forty-three stressors according to “life change units” with marriage being equal to fifty LCU’s; cumulative LCU scores greater than 200 in one year signified a risk and greater than 300 signified being gravely at risk of certain diseases (Harrington, 2008).

**The age of anxiety.** After the end of World War II, the United States was officially the world’s richest nation with many employed in “white-collar” jobs, a huge housing boom, movement to the suburbs, and an emphasis on the nuclear family and material comfort. According to Harrington (2008), “the 1950s was not just an era of television and two-car garages; it was also, as many historians have observed, the ‘age of anxiety’” (p. 158). Part of this anxiety stemmed from the return to traditional gender roles as women were no longer employed as they had been during war. Although many women began to receive psychotherapy and minor tranquilizers as they struggled with the transition, attention centered on the bread-winning husband.

**From monkeys to man.** A 1958 article by American behavioral neuroscientist Joseph Brady entitled “Stress in ‘Executive’ Monkeys” about monkey pairs receiving shocks was published in *Scientific American* and proved pivotal to both psychosomatic and cultural phenomena. In the study, each monkey received one lever and only one of these levers resulted in cessation of electric shocks for both monkeys; the responsibility for controlling the working, shock-relieving lever was given to the “executive” monkey. Brady found that within a few days the “executive” monkeys were more likely to have gastric ulcers despite the monkeys receiving an equal number of shocks and concluded that the executive decision maker has more stress and is ultimately more susceptible to stress-related disease. Brady’s next move was crucial: he argued that this same concept could be extended to the workplace.

**External and internal environment.** Interdisciplinary support was immense and by the 1950s and 1960s, there was universal agreement that stress was a cumulative experience (Harrington, 2008). In the late 1960s and 1970s, research showed that people responded differently to the same stressors, the opposite of the reductionist and mechanistic beliefs of the mind a century earlier. University of California Berkeley psychologist Richard Lazarus was a groundbreaker in his claim that humans are unlike machines in that we succumb to stress only when our ability to cope is insufficient.

With Lazarus’ claims, the view of stress shifted from research solely examining external forces to looking at an individual’s capability to internally adapt, leading to the birth of the cognitive, or transactional, school of stress research by the 1970s. This school stated that some people were intrinsically predisposed to stress and at risk of early death from heart failure due to their type A behaviors (TAB) such as impatience, competitiveness, and perfectionism, which will be further explored in the scientific/biological section.

### **PSM's Survival Through Alternativism and Positive Thought**

Despite its impressive gains in the early and mid-twentieth centuries, by the 1970s and 1980s, PSM was hanging on by a thread due to public criticisms of Freud, the pharmacological revolution, and a general lack of focus and agreement within the field (Harrington, 2008). However, psychosomatic medicine was able to flourish underground in alternative, holistic, and feminist medicine especially as the medical community garnered criticism from the public that medicine was becoming too separate from the patient.

**Oncological origins.** During the 1970s war on cancer much time and energy went into the creation of chemotherapy and radiation therapies; however, by the 1980s, many patients—and some medical professionals—began to become frustrated that pharmaceutical interventions rarely cured cancers and turned toward alternative explanations. One influential leader was Yale University surgeon Bernie Siegel who tried to analyze and quantify a resilient personality that simply forgot how to die, similar to what Dunbar and Alexander had done in prior decades (Harrington, 2008). Using old psychosomatic literature as a guide, Siegel characterized these survivors as feisty, in touch with their needs, and openhearted and in 1986 made the bold assertion that there are no “incurable diseases” only “incurable patients.” In his book *Love, Medicine, and Miracles*, Siegel (1986) stated that

the body responds to the mind's messages, whether conscious or unconscious. In general, these may be either “live” or “die” messages... [W]hen a human being suffers an emotional loss that is not properly dealt with, the body often responds by developing a new growth. It appears that if we can react to loss with personal growth, we can prevent growth gone wrong within us (p. 67, 77 as cited in Harrington, 2008, p. 99).

Although his statements were controversial and one follow-up study found that subjects in his Exceptional Cancer Patient Program study had the same death rate at ten years as the control group, the belief that positive thinking and emotional control could influence cancer was substantial. During a time of surmounting frustration with one futile drug after another in the war on cancer, the message that the mind could heal the body was not only much more appealing than failing pharmacological measures but also much more intimately tied to the person; as a result, public support grew and literature on coping thrived.

**Extension to HIV.** With the onset of the 1980s HIV epidemic and in combination with emerging PNI research on cancer, the prevailing mindset became one in which positive thinking had the ability to boost immunity and halt progression of cancer, especially when paired with visual imagery. In the late 1980s, many AIDS patients felt marginalized by not only society but the medical community as well; in this regard, if the research was true,

they of all people—with grossly compromised immune systems—needed to be sending only messages of survival to their bodies. Think negative thoughts, some patients said, accept the death sentence pinned onto you by the medical community, and you effectively condemn yourself to a self-fulfilling prophecy (Harrington, 2008, p. 129).

In an 1985 article touting “voodoo death,” psychiatrist Sanford Cohen provided evidence to support that AIDS patients were susceptible to negative attitudes and emotions; he described how one patient’s mother found out that her son was gay and had AIDS and prayed for his death aloud in his intensive care unit room only for her son to die one hour later despite being in the early stage of the disease. PNI further supported this view and in 1986 Lydia Temoshok and George Solomon noted that “superb attitude, determination, ‘fighting spirit,’ . . . and other psychosocial attributes” played a “significant role” and that despite having severely low T cell

counts, some AIDS patients fared relatively well and were nonetheless remarkably quite healthy (Harrington, 2008, p. 130). Through alternative viewpoints and the power of positive thought, psychosomatic medicine would manage to survive.

### **The Natural Sciences Perspective**

The natural sciences utilize the scientific method to draw conclusions about the world and offer perspectives of the mind and body that have historically supported or refuted their relationship with each other. The natural sciences did not play a significant role in mind-body medicine until around the sixteenth and seventeenth centuries when the Scientific Revolution and the Enlightenment demanded scientific thought, discovery, and rationale. Topics in this section build upon the philosophical and social science sections explored earlier and include invisible fluids, mesmerism, and animal magnetism; the rise of neurology; the science of stress; and the integration of psychosomatic medicine into the natural sciences. Refer to Appendix B Figure B3 throughout for a visual representation of highlighted material from this section.

#### **Invisible Fluids**

The microscope and early scientific technologies of the sixteenth and seventeenth centuries allowed for the discovery of invisible fluids such as animal heat, ether, and organic molecules, particles that had previously been thought to be nonexistent. The concept of “invisible fluids” was further extended to the human body in the late eighteenth century by the Viennese doctor Anton Mesmer who in his interest in the theory of gravity claimed that the human body contained an invisible fluid that responded to planetary gravitation (Harrington, 2008). Mesmer treated his patients by moving mineral magnets and eventually simply his hands around them, correcting their fluid disruptions through his animal magnetism, or invisible magnetic force. Baths of iron filings in water with large iron rods, mirrors reflecting back

circulating invisible energy, and an invention called an armonica playing behind purple curtains were additionally all used to balance these invisible fluids.

### **The Nervous System Takes Charge**

**The rise of nerves and neurypnotism.** Within a few decades, the Era of Romanticism evolved and along with this came the theory that the mind was not as static and predictable as was believed during the Enlightenment; a key influence to this thought was the growing interest in and understanding of the nervous system. During the mid-late nineteenth century, victims of what were thought to be stressful-like circumstances gave in to “nerve forces,” succumbing to physical or mental illnesses (Shorter, 1997). The brain was viewed as an electrical battery transferring electricity and power to the nerves. The fast-paced nature of urban industrialization added to the theory as having “nervous” fits was thought to be a sign of too much stress and too much activity as though a haywire electric current blew a fuse inside someone.

Drawing upon the understanding of the day, Manchester physician James Braid argued that animal magnetism was not the cure for many illnesses such as hysteria but rather fixating the mind and eyes, which he coined neurypnotism. According to Braid (1843), neurypnotism—which eventually became known as hypnotism—was “a simple, speedy, and certain mode of throwing the nervous system into a new condition, which may be rendered eminently available in the cure of certain disorders” (p. 4). Despite its connections to scientific understandings of the time, the medical community dismissed Braid’s research as nonscientific farce.

**Beard’s neurasthesia.** In the 1880s, New York neurologist George Beard coined the term neurasthesia to refer to dysfunctions of the nervous system. Beard (1881) explained the cause of “American nervousness” to be “dependent on five elements—steam power, the periodical press, the telegraph, the sciences, and the mental activity of women,” stating that

“when civilization, plus these five factors, invades any nation, it must carry nervousness and nervous diseases along with it” (p. 96). Beard also used Thomas Edison’s new invention of the light bulb to further clarify his sentiments which are reminiscent of the mechanistic thought of the Industrial Revolution:

Edison’s electric light is now sufficiently advanced in an experimental direction to give us the best possible illustration of the effects of modern civilization on the nervous system...[W]hen new functions are interposed in the circuit, as modern civilization is constantly requiring us to do, there comes a period, sooner or later, varying in different individuals, and at different times of life, when the amount of force is insufficient to keep all the lamps actively burning; those that are weakest go out entirely, or, as more frequently happens, burn faint and feebly—they do not expire, but give an insufficient and unstable light—this is the philosophy of modern nervousness” (Beard, 1881, p. 98-99).

Treatments of the day reflected this notion of “bad nerves.” Patients were removed from their families and given diets to build blood and fat reserves, women were given electrical currents or placed strictly on complete bed rest, and men—such as Teddy Roosevelt in his youth—were sent into the wilderness (Harrington, 2008).

**Charcot secures neurology’s supremacy in the modern era.** In the late nineteenth century, Jean-Martin Charcot picked up Braid’s methodology and used it to induce the three hysteric stages of catalepsy, lethargy, and somnambulism and treat the convulsions, paralyses, tics, paresthesias, and feelings of choking associated with hysteria (Harrington, 2008). With the advent of technological advancements, Charcot was able to capture photographic evidence of

posed hypnotized patients with hysteria, solidifying the importance of physiologic laws and science. Charcot's influence was monumental in that

by transforming hypnosis into an induced (hysterical) pathology that followed regular, physiological laws, Charcot had succeeded in doing two things: giving an aura of respectability to the subject; and staking a clear claim to the medical profession's exclusive competency to deal with it (Harrington, 2008, p. 55).

In simple words, the nerve doctors were back in business and would continue to be until the early twentieth century where neurology would conflict with psychoanalysis and the growing field of psychosomatic medicine (as explained in the Social Sciences section).

### **The Science of Stress**

In the early 1900s, "stress came into our lives, not as a disease, not as a human experience, but as a discovery in the laboratory" greatly influenced by researchers such as Walter B. Cannon and Hans Selye (Harrington, 2008, p. 145).

**Walter B. Cannon: Homeostasis and chronic stress' link to physical illness.** During his late-1920s research on peristalsis and digestion using X-rays, Harvard experimental physiologist Walter B. Cannon discovered that animals experienced greatly decreased peristalsis when they were angry or distressed (Harrington, 2008). In order to study the relationship between emotions and inhibited peristalsis, Cannon drew the blood of cats in cages after a dog was brought near them and compared it to the blood of cats who did not have the traumatic experience. Cannon found that the distressed cats' blood had high adrenin, or epinephrine, levels. It was known that when animals were injected with adrenin, their pupils dilated, blood glucose levels increased, blood pressure increased, piloerection occurred, and digestion was inhibited, but at the time there had was no awareness of the ability of emotional excitation to



elicit physiological changes. Cannon (1929) connected this to the nineteenth century Darwinian concept of the “survival of the fittest,” stating that the physiologic changes “in pain and emotional excitement have been interpreted...as biological adaptations to conditions in wild life which are likely to involve pain and emotional excitement, i.e. the necessities of fighting or flight” (p. 219). Cannon labeled the state of balance within the body homeostasis, and in 1937 he discovered that not only the adrenal gland but other parts of the nervous system were involved in the regulatory systems which would later become known as the parasympathetic and sympathetic nervous systems (Harrington, 2008).

Cannon then extended this notion to human beings, reminiscent of the extension of universal invisible fluids to the human body, stating the humans also have the capacity to respond through homeostatic mechanisms. Cannon argued that the modern lifestyle forced people into the role of “cats faced with dogs perpetually barking at them” and that with this constant activation of the fight or flight response there were few periods of rest to restore homeostasis; in turn, Cannon hypothesized, we were more likely to suffer illness as a consequence. In this manner Cannon was indeed influential in urging mainstream medicine to recognize that chronic stress could cause physical illness.

**Stress: Hans Selye style.** In the early 1930s, Czech-born endocrinologist, biochemist, and experimental physiologist Hans Selye was conducting experiments looking for new female sex hormones by injecting cow ovaries into female rats when he came upon a curious situation; although Selye found no changes in the rats’ sex organs, he noted that they all had enlarged adrenal glands, smaller immune tissues, and peptic ulcers in the stomach and upper intestine after the injections (Harrington, 2008). The same response occurred when cow spleen and kidneys were injected into the rats. Curious as to whether the rats’ bodies were exhibiting a nonspecific

reaction to trauma, Selye submitted the rats to various forms of stress such as sewing their eyelids shut and placing them under bright lights, on the roof in winter, and in continuously revolving hamster wheels and found that no matter what the stressor, if the stressor was great enough and the animal survived, there was always the combination of adrenal hyperactivity, lymphatic atrophy, and peptic ulcer formation. Selye's research appeared as a letter to the editor in *Nature* in 1936.

Similar to Cannon, Selye then turned this concept to human illness noting that most patients exhibited similar prodromal symptoms such as fatigue and weakness. According to his autobiography, Selye (1979) began to question "why so many people suffer from heart disease, high BP, arthritis, or mental disturbances," saying "these are not completely stereotyped signs of all illness, yet they are so frequent that I could not help suspecting some non-specific common factor in their causation" (p. 61). By 1956 Selye had labeled this schema stress, defining it as "the rate of all the wear and tear caused by life" (Breedlove, Watson, & Rosenzweig, 2010, p. 467). Originating in the fourteenth century as implying hardship or adversity, stress was taken by Selye from metallurgy and engineering but misnamed because stress was defined as "forces that act to deform or weaken metals; it did not refer to the resulting condition of the metals themselves" and therefore it should have been labeled strain not stress (Harrington, 2008, p. 150, 278).

***The general adaptation syndrome.*** After defining stress as being a nonspecific reaction to any demand, Selye developed the hypothesis of the general adaptation syndrome, or GAS. The GAS consists of the following phases: the alarm reaction, resistance, and exhaustion phases. The alarm reaction phase, in which there is an initial response to a stressor and the body prepares for fight or flight, is characterized by the endocrine release of hormones resulting in increased

blood glucose, pupil dilation, increased heart and respiration rates, increased perspiration, and decreased digestion—physiological processes Cannon had observed in his research (Breedlove et al., 2010; Harrington, 2008). In the adaptation stage, the body reverses the characteristics of the alarm stage by responding efficiently and effectively to restore homeostasis via opposing physiological mechanisms (Breedlove et al., 2010). Afterwards, Selye noted there was an increased resistance to the assaulting agent, which was soon labeled the stressor (Harrington, 2008). However, if the stress is prolonged, commonly reoccurs, or the body is unable to restore homeostasis, a third phase known as the exhaustion phase occurs, leading to physical exhaustion, decreased immune function, and increased susceptibility to stress-linked disease (Breedlove et al., 2010; Harrington, 2008).

***Hypothalamic-Pituitary-Adrenal axis.*** Although all individuals respond differently to stress and various factors affect this response such as the individuals' perceptions, coping abilities, age, genetics, and status of the nervous, endocrine, and immune systems, generally speaking in response to the "threat" imposed by a stressor the body triggers the hypothalamic-pituitary-adrenal (HPA) axis, a feedback system designed to prepare the body to counteract the stressor (Breedlove et al., 2010). In turn, the HPA axis also ultimately regulates many bodily processes such as energy storage or use, digestion, immunity, and emotions. In response to stress via sensory input to the brain, the hypothalamus is triggered to produce corticotropin-releasing hormone (CRH) which in turn causes the release of adrenocorticotrophic hormone (ACTH) from the anterior pituitary gland. ACTH causes the release of corticosteroid, or glucocorticoid, hormones such as cortisol, corticosterone, and hydrocortisone from the adrenal cortex and the production of these corticosteroid hormones suppresses inflammation as well as the immune system; although this may appear counterintuitive in terms of immunosuppression,

survival is the priority and meeting the body's high energy demands become the primary concern.

Natural selection favors the stress response as a drastic—albeit necessary—response to deal with what is ideally only a short term problem (Breedlove et al., 2010). After the stressor is no longer a threat, the body begins the process of returning to homeostasis; however, if the stress response is consistently activated or activated over an extended length of time the body becomes “burnt out” and eventually death occurs, as Cannon hypothesized. Sapolsky (1992) explains the consequences of prolonged activation of the stress response: prolonged inflammatory and immune suppression leads to increased disease susceptibility; the constant and high demand for energy leads to fatigue, muscle wasting, and steroid diabetes; suppression of growth factors and growth hormones promotes psychogenic dwarfism and bone decalcification; digestive suppression fosters ulcer development; increased cardiovascular tone leads to hypertension; reproductive suppression leads to decreased libido, cessation of ovulation, and impotency; decreased sensitivity may result in apathy; and alterations in sensory and cognitive thresholds accelerates the aging process (as cited in Breedlove et al., 2010).

*Criticism and support of Selye.* Selye's hypothesis was not universally accepted. Many skeptics, such as Walter B. Cannon himself argued that Selye's findings were exaggerated or artificial; however, Selye gained interdisciplinary support through military psychiatrists, psychosomatic medical clinicians, general practitioners, special-interest lay groups, and the general public, who were ready to accept a “more modern” view than nerves provided. As one commentator in 1956 noted, Selye's work “permeated medical thinking and influenced medical research in every land, probably more rapidly and more intensely than any other theory of disease being proposed” (Engel, 1956 as cited in Harrington, 2008, p. 151-152).

### **Integration of Psychosomatic Thought into the Natural Sciences**

The natural sciences continued to feel pressure to join the more popular field of psychosomatic medicine during the first half of the twenty-first century. However, the medical community was slow to jump on the bandwagon with the only medical reference in psychosomatic literature before 1970 being a 1962 article by George Vaillant in *Psychosomatic Medicine* looking at therapeutic approaches to the treatment of schizophrenia (Harrington, 2008). Vaillant (1962) encouraged the medical community to expand their horizons and develop “confidence and faith” in psychosomatic therapies that would most likely seem “pretty banal... [as] we are physicians, not purveyors of positive thinking” (p. 231).

**The Cousins counterrevolution.** Psychosomatic integration into the natural sciences in the form of positive thinking was first seriously looked at in the late 1970s after Norman Cousins, a well-known intellectual and editor of the *Saturday Review* wrote “Anatomy of an Illness (as Perceived by the Patient)” which was published in the 1976 *New England Journal of Medicine*, the most prestigious medical journal of the day. The autobiographical article detailed Cousins’ experience with ankylosing spondylitis in the 1960s during which he incorporated humorous self-treatments such as watching reruns of *Candid Camera*, Marx Brothers films, and reading funny literature. After reflecting on Hans Selye and Walter B. Cannon’s research focused solely on the negative impact of negative emotions, Cousins posed a challenge to the medical field and raised questions about the powers that positive emotions might hold on the body.

During the time of Cousins’ article, the medical community was receiving backlash from the public that health care professionals were more interested in their profession, not their patients, and alternative forms of thought—as mentioned in the Social Sciences section—as well

as therapy such as acupuncture, biofeedback, and meditation began to thrive. According to Harrington (2008),

Cousins's sudden arrival on the scene looked like a lifeline to many in the medical profession...Here was a patient interested in exploring holistic alternatives to the mainstream, but who told the mainstream medical profession that he wanted to ally with rather than fight them (p. 124-125).

Cousins would later join the faculty of the University of California, Los Angeles as Adjunct Professor of Medical Humanities and in the 1980s was part of the task force leading research on PNI; today the Norman Cousins Center for Psychoneuroimmunology at UCLA exists in his honor.

**Placebos and the empiricalization of positive thought.** The use of placebos—Latin for the phrase “I shall please”—became important in scientific research in the early nineteenth century; however a paper submitted by physician Oliver Hazard Perry Pepper in 1945 was the first to mention placebos in medicinal literature (Harrington, 2008). The use of these bread pills, powders, tonics, subcutaneous water, and tinctures had a controversial history with some professionals seeing it as quackery and others viewing it as useful. In his influential 1955 article “The Powerful Placebo” in the *Journal of the American Medical Association*, Henry Beecher referred to the effects of placebos as “pseudosymptoms” in that placebos could produce similar results as suggestions and warned of their skewing influence on research results. The power of placebos, which had not been looked at for decades, resurfaced with Cousins' article as well as medicine's growing interest in the implications of positive thought. Further support came from the early 1970s discovery of the endogenous opioid peptides and neurotransmitters endorphins, a 1978 report of the opioid blocker naloxone being used without the subjects knowing and

reporting pain despite receiving a painkiller, and University of Rochester's Robert Ader's research in PNI—all supporting the mind-body connection from a medical view (Breedlove et al., 2010; Harrington, 2008).

**The debate over the credibility of positive thought.** Support for the power of positive thinking was not unanimous, however. In 1985, *New England Journal of Medicine* editor Marcia Angell wrote:

[W]e are told that just as mental state causes diseases, so can changes in our outlook and approach to life store health... Is there any harm in this belief, apart from its lack of scientific substantiation? It might be argued that it allows patients some sense of control over their disease. If, for example, patients believe that imagery can help arrest cancer, then they feel less helpless; there is something they can do. On the other hand, if cancer spreads, despite every attempt to think positively, is the patient at fault? It might seem so... After all, a view that attaches credit to patients for controlling their disease also implies blame for the progression of the disease... In addition to the anguish of personal failure, a further harm to such patients is that they may come to see medical care as largely irrelevant... and give themselves over completely to some method of thought control (p. 1570-1572).

By the late 1990s, the reign of the power of positive thought had been drastically diminished. A 1999 article published in *The Lancet*, one of the oldest and most prestigious medical journals, reported that patients with a “fighting spirit” had no greater chance of survival from cancer than others—although the study also found “a significantly increased risk of relapse or death” was correlated with high “helplessness and hopelessness” and “depression” scores—and helped to

bring an end to the scientific community's attempt to empiricalize positive thought (Harrington, 2008, p. 132-133).

### **The Theological Perspective**

As people have historically struggled to understand the meaning behind illness and suffering, they have often found the answer in the form of spirituality. The theological perspective is closely aligned with a holistic view of the mind and body as both are carefully attuned to the metaphysical and mysterious nature of our surroundings and beings. The influence of theology on the evolution of the mind-body understanding will be explored in this section with a special focus on the ancient foundations of holism and moralism and the psychosomatic link of theology with positive self-thought. Refer to Appendix B Figure B4 throughout for a visual representation of highlighted material from this section.

#### **Holism Through Moralism**

From ancient times up until the Protestant Reformation of the sixteenth century, religion played a significant role in mind-body medicine as a holistic view of the human was promoted through various religions. Illness was most often understood through a moral standpoint as a result of the evil actions of persons or the community, a test of faith, or a call to conversion. Illness frequently occurred in the form of demonic possessions, as evidenced by possession stories being reported in all societies of the world. In the 1960s, anthropologist Erika Bourguignon found that seventy-four percent of the 488 societies she studied had possession stories (Harrington, 2008).

Supportive evidence is also found throughout ancient religious texts. For example, in the *Sahih al-Bukhari* (c. 800s CE), considered the second most authentic Sunni Muslim book after the Qu'ran, there is a warning against djinn, or devils: "The Prophet said, 'Cover your utensils



and tie your water skins, and close your doors and keep your children close to you at night as the djinn spread out at such time and snatch things away” (Sahih Bakhari 4.533, as cited in Guiley & Imbrogno, 2011, p. 61). Judeo-Christian records as early as 200 BCE chronicled possession stories and in the early first century CE, the New Testament recounts Jesus casting out demons through exorcisms. The word exorcism itself comes from the Greek word *exorkizein* meaning “to bind by an oath,” referencing the need for calling on higher powers (Harrington, 2008).

**The Protestant Reformation and the fall of religious authority.** The Protestant Reformation of the sixteenth century signified a key turning point as there became a mass call for separation between secular and divine, sparked by individuals such as Martin Luther and John Calvin. One way the Church attempted to continue to exert its authority was through the decree that only priests could perform exorcisms. In 1614, Pope Paul V’s *Rituale Romanum* laid out the formal procedure and this would remain unchanged by the Roman Catholic Church until 1999. According to Harrington (2008), the priest was the “spiritual physician-cum-surgeon,” able to produce convulsions on demand similar to the eighteenth and nineteenth century nerve doctors (p. 37). However, the possession of Marthe Brossier proved counterfeit by physician Michael Marescot in 1598 was highly publicized and proved costly to the credibility of the Church when it came to matters of divine authority in an increasingly secularized world. The new discovery of physical forces provided further evidence that natural laws could explain some of the things previously thought that only spirits could do. By the seventeenth and eighteenth centuries, religious authority in medical matters was all but extinct as the focus became one of physical rather than metaphysical factors.

**Religious Revival Through Positive Thought**

Religion would not play a key role in medicine until it would again resurface during the late nineteenth and early twentieth centuries with “miracle cures” and the counterrevolution against the natural sciences through alternativism.

**The “miracle cures” of Lourdes.** In 1858 in Lourdes, France Bernadette Soubirous was believed to have witnessed the apparition of the Immaculate Conception. By 1876, the site of the apparition was designated as a holy place of pilgrimage and healing by the papacy. To this day there have been a total of sixty-six cases out of thousands of reported claims that have been declared medically unexplainable by the Medical Bureau with the most recent being in 1999 (Harrington, 2008). The miracles at Lourdes were significant in that they identified two groups of people: a) those who believed the mind had the power to heal but did not believe in supernatural influences and b) those who did not make distinctions between the mind and a higher power and challenged the conventional medical beliefs of the first group. Despite the prevailing authority of neurology during the time, some—such as Bernheim and Charcot—although skeptical about the miracles at Lourdes, were open-minded about the possibility of a “psycho-physiological power of faith” and began to look at the natural healing powers of the mind (Harrington, 2008, p. 110).

**The birth of Christian Science.** In the United States, the medical community did not participate in the curiosities in France during the latter half of the nineteenth century; rather, the revival of religion and the power of faith would come to America in an interesting form—that of Christian Science. According to Harrington (2008), this time period marked a phase in which women were

understood to be physically frail and prone to illness, but mind-cure offered them a means of conquering their physical limitations. The minds of women were supposed to be more intuitive than rational, but mind-cure taught that these intuitive qualities were the very ones that opened the door to divine power...femininity was—or could be—a source of strength rather than weakness (pp. 111-112).

Through this unique perspective, Christian Science was born and extended its challenge of religious authority to scientific authority. Its founder, Mary Baker Eddy, stated that illness and disease were merely illusions and that everyone was actually healthy and well, pointing to the fact that our current medicine and laws of science could not explain why oftentimes survival ensued despite a case being considered medically futile. Christian Science was influential in not only drawing attention to faith cures but perhaps more so in its early promotion of the positive thought movement that would revolutionize the medical community a century later.

**The New Thought revolution.** Around the same time as Christian Science, there were also formations of other hybrid medical/religious groups such as Divine Science, Unity Church, Mind Science, and Religious Science (Harrington, 2008). This collective movement was named “New Thought” in 1915 with Christian-founded mesmerist Phineas Parkhurst Quimby as the founding father. Mantras, prayers, and meditations focused on the power of positive thinking, such as the “Prayer for the Dyspeptic,” found in the 1887 *Mind-Cure Mentor* which reads as follows:

Holy Reality. We BELIEVE in Thee that Thou are EVERYWHERE present. We really believe it. Blessed reality we do not pretend to belief. WE BELIEVE. Believing that Thou are everywhere present, we believe that Thou are in the patient’s stomach. Help us to stoutly affirm with our hand in Your hand, with our eyes fixed on Thee, that we have

no Dyspepsia, that we never had Dyspepsia, that we will never have Dyspepsia, and that there is no such thing, that there will never be any such thing. Amen (Hazzard, 1887, p. 153-154 as cited in Harrington, 2008, p. 117).

Although the “positive thought” approach stemmed from religious beliefs, it would later be absorbed beyond religious communities and extend to secular communities as well, as evidenced by the infiltration of positive thought into the social and natural sciences, as well as the humanities.

**The psychosomatic connection.** Religious concepts such as hope and faith would also be re-encountered during the psychosomatic era of positive thought in the late 1970s and 1980s. Momentum arose from Cousins’ 1976 article in the *New England Journal of Medicine* as he challenged the medical community about the therapeutic value of “love, hope, faith, laughter, confidence, and the will to live” and the power of faith and positive emotions began to be researched (p. 1459). Not only would the scientific community embrace this possibility (as evident in the social sciences and natural sciences sections) but so would the public as well.

### **The Humanities Perspective**

The humanities—including fine art and literature—have a reciprocal nature with the themes presented by philosophy, the social sciences, the natural sciences, and theology, alternating between being the influencer and being the influencee. Although common beliefs and perceptions of the day have always been evident throughout history, this section focuses on four themes: the public’s response to neurology; personality profiling of the twentieth century; New Thought, psychosomaticism, and positive thought; and the notion of stress. Refer to Appendix B Figure B5 throughout for a visual representation of highlighted material from this section.

**Neurotic, Nervous Nellie: Unnerving the Public**

Although the appreciation of the influence of the mind was gaining scientific support by the late 1800s through the integration of psychological and physiological thought about hysteria, the public remained leery of the repercussions of the growing awareness of the mind's ability to influence the body. Exemplified and reinforced through popular literature such as George du Maurier's 1894 fictional work *Trilby* in which a hypnotist named Svengali turned a young woman into a sex slave as well as public displays of mesmerism and hypnosis, the public perception of hypnosis and the mysteriousness of the emerging field of neurology was one of both mistrust as well as fear (Harrington, 2008). For example, many interpreted *Trilby* as a non-fiction piece, further adding fuel to the growing distrust of nerve doctors and their authority.

This public skepticism would carry over into the twentieth century, particularly through Freud's message that the patient was often not fully reliable as evidenced by his theories of repressed fantasies to which patients were ashamed of admitting (Shorter, 1997). Additionally, revolution against the authority of physicians by patients and the public was a recurring theme throughout the latter half of the twentieth century as well, sparking social activism. For instance, after widespread lobbying by Vietnam vets, the American Psychiatric Association replaced the diagnosis of "war neurosis" with post-traumatic stress disorder (PTSD) in 1980, returning to the concept of "shell shock" in that war in any form represented a traumatic experience. The feminist movement of the 1970s and 1980s was also critical and brought forward the topics of rape, domestic violence, and childhood sexual abuse and through activism these scenarios also qualified for PTSD (Harrington, 2008, p. 95).

### **The Personality Profiling Phenomenon**

The personality profiling of psychosomatic medicine during the 1930s-1950s by Dunbar and Alexander and in the 1980s by Siegel extended beyond academia, significantly influencing the humanities. Dunbar's article had vast implications for decades. For instance, an article in the August 1969 issue of *Family Weekly* claimed accident-proneness as a major health issue and stated that the repression of frustration, guilt, and anger "can be as dangerous as faulty brakes or a broken step" (Engelhardt, 1969, p. 5). In 1957, an Army recruit ulcer study found that those developing ulcers had "excessive infantile desires for love and feeding" while the *Ladies' Home Journal* and *Reader's Digest* made psychosomatic findings a part of popular culture and knowledge (Harrington, 2008, p. 93). In Frank Loesser's 1950 Broadway musical *Guys & Dolls* one of the characters named Adelaide suffers from chronic respiratory issues which her doctor thinks is psychosomatic. At the beginning of the song "Adelaide's Lament," Adelaide sing-songingly reads from a book: "It says here... 'The average unmarried female; Basic'lly insecure; Due to some long frustration; May react; With psychosomatic symptoms; Difficult to endure; Affecting the upper respiratory tract.' In other words, Just from waiting around; For that plain little band of gold; A person can develop a cold!" (as cited in Harrington, 2008, p. 93).

**The "cancer-prone" personality.** Personality profiling was further extended and as early as the 1940s, authors such as W.H. Auden in his poem "Miss Gee" attempted to correlate certain characteristics with cancer (Harrington, 2008). By the 1950s, the "cancer-prone" personality became an academic and cultural sensation with that belief that chronically repressed sexual and aggressive urges would turn into tumors without an outlet. In 1960, author Norman Mailer stabbed his wife in the chest, arguing in his criminal case that if he did not kill her he would have developed cancer due to pent-up anger. His writings reflected his beliefs; for

instance, in 1965's *An American Dream*, Mailer's character Rojack states "Cancer is the growth of madness denied. In that corpse I saw, madness went down to the blood—leucocytes gorged the liver, the spleen, the enlarged heart and violet-black lungs, dug into the intestines, germinated stench" (p. 267 as cited in Harrington, 2008, p. 270). Although his wife survived and later dropped the charges, the case received notoriety.

Not all of the literature on the cancer personality was supportive of academic and public perceptions; for example, essayist, political activist, and breast cancer survivor Susan Sontag (2001) warned about the myths and metaphors around illnesses such as cancer and how these and profiling individuals placed the blame on the patient, perpetuating inaccurate beliefs as well as minimizing the quality of life of individuals living with the illness.

**Type A behavior be warned.** As a result of the modern, hectic lifestyle and the birth of the transactional school of stress research, by the mid-1970s talk about type A personality permeated popular culture and "functioned as a kind of caricature of ambitious, competitive masculinity" (Harrington, 2008, p. 165). Those with the competitive and perfectionistic nature of the Type A personality were encouraged to do small stress-reducing things and self-help books such as the 1974 *Type A Behavior and Your Heart* blossomed, encouraging office changes such as fewer phone interruptions and coffee breaks (Harrington, 2008). The Type A and Type B personality theory has remained pervasive ever since with countless references in media ranging from the 1968 film *The Odd Couple* to the 2005 film *In Her Shoes* to the availability of dozens of free online tests and popular magazine quizzes to determine personality types.

### **From New Thought to Positive Thought**

The "New Thought" movement impacting the philosophical, social science, natural science, and theological perspectives of the late nineteenth and early twentieth century

undoubtedly extended to the popular public. Henry Ford's comment on capitalist America—"If you think you can, you can. And if you can't, you're right"—was derived from New Thought philosopher Ralph Waldo Trines' *In Tune With the Infinite* (Harrington, 2008). Multitudes of economic New Thought-oriented books such as Wallace Wattle's 1910 *The Science of Getting Rich*, Dale Carnegie's 1936 *How to Win Friends and Influence People*, and Napoleon Hill's 1937 *Think and Grow Rich* flourished during the early 1900s and especially during the era of the Great Depression. New Thought was so pervasive that not even the youngest would escape its influences. For instance, the 1906 Sunday school story *Thinking One Can* would later be published in 1930 by Platt and Munk as the now highly beloved children's book *The Little Engine That Could* (Harrington, 2008).

**The positives of being positive.** In the 1952 book *The Power of Positive Thinking*—its title taken from a line by New Thought writer Charles Fillmore—author Norman Vincent Peale connected New Thought style to Freudian psychotherapy and the current psychosomatic medicine of the time (Harrington, 2008). This was closely followed by Peale's 1959 follow-up book, *The Amazing Results of Positive Thinking*. In the following excerpt, Peale (1959) explains:

Smith has never again had need to revert to the habit of taking tablets. He learned the amazing power of positive thinking to heal. Let me repeat. The technique is to believe that you are going to be better, believe that positive thinking is going to work for you, and remedial forces actually will be set in motion (p. 214).

*The Power of Positive Thinking* sold over twenty million copies and was second on the best seller list behind only the Bible in the 1950s; Peale held a weekly radio program on NBC for fifty-four years titled "The Art of Living" and reached 4.5 million in circulation through his



*Guideposts* magazine (Harrington, 2008). Peale's influence is still seen today, including the sentiment that "when life gives you lemons, make lemonade;" a recent and local rendition of this phrase can be seen in Minneapolis hip hop group Atmosphere's 2008 album title: *When Life Gives You Lemons, You Paint That Shit Gold*.

**Support through self-help literature.** The powers of positive thought also extended beyond the natural and social sciences to public perceptions about illness and disease. In 1986, psychiatrists Lydia Temoshok and George Solomon noted that "superb attitude, determination, 'fighting spirit,' ...and other psychosocial attributes" played a "significant role" and that despite having severely low T cell counts, some AIDS patients fared relatively well and were nonetheless remarkably quite healthy (Harrington, 2008, p. 130). Based on this, HIV/AIDS patient support groups drew inspiration and proclaimed that they could choose to live. In 1978, the self-help book *Getting Well Again* by authors O. Carl Simonton, Stephanie Matthews-Simonton, and James Creighton was released, gaining much public support for its suggestions of self-awareness and its role in cancer treatment (Harrington, 2008). In 1986, Bernie Siegel's book *Love, Medicine, and Miracles* was published. In the book, Siegel (1986) advises individuals with cancer that they, too, might survive through self-awareness and resilience: "Hoping means seeing that the outcome you want is possible, and then working for it" (p. 178).

### **The Modern American Diet: Stress as a Staple**

Since the birth of stress in the laboratories of the 1920s-1950s, never has a concept appeared to impact every facet of American life and media so greatly. Newspaper headlines touted the following: "Stress may be worst killer of the modern era" (1955); "Modern Life includes toll exacted in terms of stress" (1970); "Stress: modern man's silent enemy" (1977); and "Premature aging the result of modern stress" (1971, as cited in Harrington, 2008). By the

1970s, the concept of stress could be found everywhere from self-help literature such as Terry Looker and Olga Gregson's 1989 *Stresswise: A Practical Guide for Dealing with Stress* to advice columns such as *Dear Abby* to popular magazine articles such as "Are we scaring ourselves to death" in the April 1955 edition of *Ladies' Home Journal* to social analyses—along with an estimated \$35 million that was spent on stress research in 1979 alone (Harrington, 2008, p. 142, 151-152).

**Gendering stress.** From practically the beginning the experience and construct of stress was thought to be different between the sexes. After Brady's 1958 article on the stress and deterioration of the health of "executive" monkeys, the implications of his findings were quickly absorbed by popular culture. Slang phrases such as "rat race" and "the tread mill" appeared, emphasizing the hectic, whirlwind life-style of the "organization men" (Harrington, 2008, p. 158-159). The stressed businessman became the focal point. As men returned to the office post-war, they experienced new or unfamiliar stresses and brought with them the "manly, military language of stress... [as] being able to think of themselves as stressed [rather than anxious] meant they could seek help without having to feel stigmatized by a feminized diagnostic label" (Harrington, 2008, p. 160). In fact, the pharmaceutical company Charles C. Pfizer made the short film "The Relaxed Wife" in 1957 with a stressed businessman additionally being the target for minor tranquilizers along with his wife; however, his prescribed reason was for stress while his wife's was anxiety (Harrington, 2008).

Women also struggled with the post-war transition as they were no longer Rosie the Riveters but once again the stay-at-home housewives. Suffering from "anxiety" rather than "stress," many women began to receive psychotherapy and minor tranquilizers, which were

nicknamed “mother’s little helpers” after the Rolling Stones’ song of the same name peaked at number eight on the billboards in 1966. An excerpt from the song goes as follows:

Kids are different today, I hear ev’ry mother say; Mother needs something today to calm her down; And though she’s not really ill, there’s a little yellow pill; She goes running for the shelter of a mother’s little helper; And it helps her on her way, gets her through her busy day (as cited in Harrington, 2008, p. 159).

**Still a staple.** It is clear that stress is still a recurring theme in today’s world. A March 10, 2012 search of the word “stress” produced 593 million hits on Google; 512 million hits on Bing; 496 million hits on Yahoo; and 21,600 hits on the National Institute of Health’s website. With the continuation of our hectic, modern lifestyle it is realistic to expect the continuation of stress and its references throughout popular culture for decades to come.

### **The Formal Discipline of Psychoneuroimmunology**

The field of psychoneuroimmunology is truly interdisciplinary with its inspiration drawing from philosophy, the social sciences, the natural sciences, theology, and the humanities. Knowing the context and theoretical traditions from which PNI emerged allows for a more thorough understanding of PNI.

### **The Evolution**

Prior to the 1970s, the immune system was thought to work automatically and independently: if a pathogen gained access to the body, the immune system’s defensive mechanisms (i.e. lymphocytes, antibodies, etc.) would begin to counteract the pathogen and either succeed in preventing infection, or fail to restore homeostasis resulting infection. In the 1960s there was a surge of research conducted on the immune system; in this naïve understanding, the nervous system had no or at the very least little role in immune function or

processes and, therefore, it was believed that infectious disorders and stress-linked disorders were separate and distinct (Breedlove et al., 2010; Frankel et al., 2003; Harrington, 2008). However, in the early 1970's and with advances in technology and scientific understanding, a reciprocal relationship between the nervous system and the immune system was discovered, defying the notion of complete system autonomy and opening the door to a new area of study—psychoneuroimmunology (Frankel et al., 2003).

In the 1960s while conducting research at the University of Rochester, psychologist Robert Ader put cyclophosphamide in saccharine water and gave it to rats, trying to make them associate the nauseated feeling caused by the drug with the sweet-tasting water; instead and much to his surprise, the majority of the rats became ill and died (Harrington, 2008). Ader was unaware of the drug's immunosuppressive qualities and enlisted the help of immunologist Nicholas Cohen. In further experiments Ader and Cohen discovered that when the rats were switched to saccharine water without any cyclophosphamide, their immune systems continued to respond as though they were suppressed. Although some controversy remains as it was found that Soviet scientists Metal'nikoff and Chorine actually unknowingly had evidence of similar findings in 1926, Ader and Cohen were given credit for discovering a form of classical conditioning that was then unknown—conditioning of the immune system—proving there was some link between the brain and the immune system and that both behaviors as well as the immune system could be conditioned (Frankel et al., 2003). The term “psychoneuro-immunology” was coined by Ader in 1964 and in the July-August 1975 issue of *Psychosomatic Medicine*, Ader and Cohen published their findings in an article titled “Behaviorally Conditioned Immunosuppression” (Frankel et al., 2003; Harrington, 2008).

The implications for the medical and scientific community were huge. An explosion of research during the late 1970s and 1980s found numerous links between the immune, nervous, and endocrine systems such as autonomic nervous system fibers innervating the thymus and spleen—organs of the immune system—affecting lymphocyte proliferation and antibody production and proving that the brain and nervous system influenced the immune system (Bakal, 1999; Breedlove et al., 2010). Additionally, it was found that the brain is informed of immune system actions and responses via peripheral axons of the vagus nerve, which are able to keenly identify cytokine activity; cytokines are proteins that promote the proliferation of cells such as interferons and interleukins and regulate B cells and phagocytes (immune cells). The endocrine system was also found to play a role with the discovery that acetylcholine is released from the vagus nerve under the direction of the nervous system to limit cytokine release (Breedlove et al., 2010). Furthermore, neurons of the hypothalamus and ventricles of the brain monitor circulating cytokines; it was also discovered that lymphocytes produce peptides that were previously believed to be found only in the brain suggesting an even deeper level of chemical communication between the systems (Breedlove et al., 2010; Harrington, 2008). These findings were extended and PNI supported the theory that “if the brain is connected to the immune system, then so is the experiential mind” (Bakal, 1999, p. 131).

As Breedlove et al. (2010), explains “all three systems [nervous, immune, and endocrine] interact reciprocally, so there is a constant state of flux” (p. 472). For example, the perception of fear triggers the stress response and leads to cortisol release from the adrenal cortex (the nervous system exerting effects on the endocrine system); cortisol suppresses the immune response (the endocrine system exerting effects on the immune system); and cytokines influence brain activity (the immune system exerting effects on the nervous system). In an opposite direction, thyroid

hormones are necessary for nervous system development (the endocrine system exerting effects on the nervous system); noradrenergic innervation affects antibody production (the nervous system exerting effects on the immune system); and endocrine responses to infection are moderated by the immune system (the immune system exerting effects on the endocrine system) (Breedlove et al., 2010).

**A new discipline.** Ader declared the birth of a new discipline, which he called psychoneuroimmunology, in 1980 during his “Presidential Address: Psychosomatic and Psychoimmunologic Research” published in *Psychosomatic Medicine*. One year later, in 1981, Ader released *Psychoneuroimmunology*, chronicling the evidence of neurological-immunological communication to mass scientific and public support (Frankel et al., 2003; Harrington, 2008). Ader’s findings along with current major findings in the field of PNI are found in Appendix A.

**Gaining support through the unsupported.** Drawing links to stress, PNI promoted a position that the 1980s HIV/AIDS community was particularly receptive to, for if stress played such a great role in immunosuppression, individuals infected with HIV or living with AIDS—already experiencing the stress of social homophobia and stigma—were at an even greater risk. Jason Serinus (1986), editor of *Psychoimmunity and the Healing Process*, a grassroots publication made for and by individuals with AIDS reflected this sentiment and took it a step further:

We believe that the AIDS virus particularly strikes individuals and groups who have been isolated by the dominant culture... It is this isolation, often internalized as self-hatred or lack of self-acceptance, which allows the AIDS virus to begin to incubate once it has entered the system... It is no coincidence that the rise of AIDS has to a large extent

coincided with the recent upsurge of right-wing political and religious repression of gays (p. 83 as cited in Harrington, 2008, p. 172-173).

However, the psychoneuroimmunological perspective of AIDS would be overshadowed by pharmacology as the first AIDS drugs such as AZT and the protease inhibitors arrived on the scene in the late 1980's and 1995, respectively. Rather than falling into obscurity as the field of psychosomatic medicine essentially did, PNI instead shifted its focus in the late 1990s to other vulnerable populations such as Gulf War veterans, oncology patients, and the elderly.

Nonetheless, according to Harrington (2008),

the early years... taught us that the modern era had not escaped the age-old plagues of infectious diseases after all; and they also taught us that the well-recognized syndrome of modern life, stress, had a reach that had not previously been suspected. We learned that by undermining immune function, stress could compromise our ability to defend ourselves against infection (p. 173)

The blossoming research findings of PNI reached the homes of more than twenty-four million Americans after Bill Moyer's five-part series *Healing and the Mind* was broadcast on PBS in 1993 and PNI has remained a leader in both the public (often unknowingly) and medical communities' approach to and understanding of health.

### **Nursing's Relationship with Psychoneuroimmunology**

Historically, the interconnectedness of the mind and body has been emphasized since the origin of nursing. Originally published in 1859, Florence Nightingale's intuitive *Notes on Nursing: What It Is and What It Is Not* provides nurse-to-nurse guidance on the key elements of the "art of nursing." Within the introductory page Nightingale (1963) acknowledges the importance of the mind-body connection:

In watching disease, both in private houses and in public hospitals, the thing which strikes the experienced observer most forcibly is this, that the symptoms or the sufferings generally considered to be inevitable and incident to the disease are very often not symptoms of the disease at all, but of something quite different—of the want of fresh air, or of light, or of warmth, or of quiet, or of cleanliness, or of punctuality and care in the administration of diet, of each or all of these... The reparative process which Nature has instituted and which we call disease has been hindered by some want of knowledge or attention, in one or all of these things, and pain, suffering, or interruption of the whole process sets in (p. 5).

Psychoneuroimmunology, a multidisciplinary field arriving over a century after Nightingale's service during the 1853-1856 Crimean War, appears to be the scientific accumulation of Nightingale's intuitive musings and the perfect link needed to establish the credibility of nursing practice. Langley, Fonseca, and Iphofen (2006) reflect on the often complicated relationship between the art and science of nursing, stating: "Nurses have often struggled to achieve a theoretical stance between the insight of an artistic position and the rigour [sic] of scientific evidence on which to base their practice" (p. 1128). However, Nightingale seems to have laid a solid foundation for bridging the gap in that she "acknowledged the importance of the effect of the mind upon the body and proposed that nursing's major role in patient care was to produce a state of mind and body conducive to healing... Research in PNI has confirmed Nightingale's perception" (Halldorsdottir, 2007, p. 36). Agree Zeller, McCain, and Swanson (1996):

Evolving from the initial conception of Florence Nightingale and through the more recent development of nursing theories, the discipline of nursing has maintained a holistic focus



of caring... PNI provides a conceptual approach that inherently integrates psychological and physiological phenomena, and thus represents a holistic paradigm consistent with the philosophical underpinnings of nursing science (p. 657, 622)

### **Medical Versus Nursing Research**

While the vast majority of medical research (i.e. immunological, endocrinological, and neurological) has been focused on understanding and mapping the underlying physiological processes of psychoneuroimmunology, nursing research has focused on the implications of these findings, in particular which nursing interventions are proven effective through psychoneuroimmunological support. Explains Zeller et al. (1996), “nursing research seeks to illuminate human responses to actual or potential health problems and the influence of nursing interventions on health status” (p. 600). McCain et al. (2005) elaborate by stating that the “use of the PNI frame allows nurse researchers to make explicit the physiological basis for the effectiveness of psychobehavioral nursing interventions designed to affect stress and coping, and ultimately, health outcomes and quality of life” (p. 324). In other words, nursing has taken a step beyond physiologically analyzing the interconnectedness of the nervous, endocrine, and immune systems to recognize, synthesize, and utilize what these implications may mean in terms of improving patients’ response through nursing care.

Although nursing research originated with Nightingale’s observational research during the Crimean War, it was not until the 1970s that patient outcomes again became the focus—this time of doctorally prepared nurse researchers (Cherry & Jacob, 2008). In the mid-1980s, nurse researchers began to advocate for the use of evidence-based research and practice, and the government responded to this call by creating the National Center for Nursing Research (NCNR) in 1985—renamed the National Institute of Nursing Research (NINR) in June 1993—at the

National Institute of Health (NIH); this established federal funding for nursing research, creating the opportunity for interdisciplinary and collaborative research. In fact, one of the nursing research priorities of NCNR Outreach 1993 was “identifying biobehavioral factors and testing interventions to promote immunocompetence” (Zeller et al., 1996, p. 662). The 1990s saw an exponential growth of nursing research, allowing the profession of nursing to utilize evidence-based knowledge and begin to inform and influence health care policy to a greater degree (Cherry & Jacob, 2008).

### **Psychoneuroimmunological Nursing Research and Implications**

Although research conducted exclusively by nurse researchers remains limited, current areas of concentration in nursing research since the 1990s include women’s health, HIV and AIDS, oncology, medical-surgical and critical care, gerontology and end-of-life care. Refer to Appendix C for summaries of nursing research studies.

**Women’s health.** Research in terms of women’s health issues has looked at perimenstrual and childbearing conditions. Groer and Ohnesorge (1993) found that guided imagery and progressive muscle relaxation lengthened menstrual cycles and decreased premenstrual syndrome symptoms in fourteen adolescent subjects (Zeller et al., 1996). Annie and Groer’s (1991) study of thirty primiparas found that heightened anxiety was partially responsible for a statistically significant decrease in salivary IgA—indicating decreased immune function—at delivery and this lower maternal IgA was associated with a higher rate of neonatal illness following the first six weeks postpartum (Zeller et al., 1996). Groer, Humenick, and Hill (1994) found that elevated cortisol levels in thirty-two breastfeeding mothers’ milk was related to increased hostile traits of the mother as well as affected infant’s behaviors in the first few months after birth (Zeller et al., 1996).

Research in the area of women's health has highlighted the necessity of appropriate and adequate stress reduction techniques and management as being useful tools in managing premenstrual and peri-partum symptomology. Groer and Ohnesorge's (1993) study provides empirical support that CAM treatments are effective nonpharmacological alternatives to decreasing distressing premenstrual symptoms. Annie and Groer's (1991) study found that anxiety during pregnancy leads to neonate immunocompetency while Groer et al. (1994) found that elevated cortisol levels—which may stem from uncontrolled stress—affects both mother and baby, raising psychoneuroimmunological implications for the mother's anxiety as well as mother-child attachment.

**HIV and AIDS.** Many nursing studies have been conducted on the psychoneuroimmunological aspects of HIV and AIDS. In a study of 153 patients with HIV, Linn, Monnig, Cain, and Usoh (1993) discovered that depression, anxiety, or a sense of coherency was not significantly related to the stage of HIV but found that more severe symptoms of HIV were correlated with depression and anxiety and a lower sense of coherence (Zeller, 1996). In a similar study of thirty males with AIDS, van Servellen, Padilla, Brecht, and Knoll (1993) found that “depression was directly related to stress levels and numbers of clinical health problems and inversely related to the stress-resistance resources of social support and intrapersonal hope. There were no significant correlations between CD4+ cell counts and any of the psychosocial measures” (as cited in Zeller, 1996, p. 662). Nokes and Kendrew's (1991) study of thirty-one men with AIDS determined that decreased psychosocial support was correlated with loneliness but did not find, as they hypothesized, that the increased reports of loneliness were associated with an increased number of infections (Zeller, 1996). Nicholas and Webster's (1993) study of forty-six men with HIV found that levels of hardiness were directly

related to social support although they could not verify a significant relationship with CD4+ levels (Zeller, 1996). McCain and Cella's (1995) study of fifty-three men affected by HIV discovered that stress was related to illness-related uncertainty, poor coping, and distress and inversely related to quality of life; they also found that stress related to lower CD4+ cell counts (Zeller, 1996).

Nursing research has also looked at the influence of CAM interventions. Eller (1994) conducted a study in which sixty-nine patients with HIV received training in either guided imagery or progressive muscle relaxation for six weeks and found that the guided imagery group had less fatigue, both groups had less depressive symptoms, and the progressive muscle relaxation group had higher levels of CD4+ counts (Zeller et al., 1996). Quinn and Strelkauskas' (1993) study, although not specifically with subjects affected by HIV or AIDS, found that practitioners and recipients of therapeutic touch have decreases in negative affect, increases in positive affect, and decreases in suppressor T-cell numbers—indicating a greater immune response; additionally anxiety levels were found to be decreased in recipients after therapeutic touch (Zeller et al., 2008).

HIV/AIDS nursing research has found that negative factors such as increased levels of stress, increased manifestations of or complications of HIV/AIDS, lack of social support and loneliness, and decreased hope are all correlated with decreased mental health of individuals with HIV/AIDS. One study also found that one of these factors—stress—had a correlation with lower CD4+ cell counts, implying decreased immunity (McCain and Cella, 1995 as cited in Zeller et al., 2008). Nursing implications that can be drawn from these studies emphasize the importance of eliminating or reducing these negative factors to promote the psychological, as well as most likely physical, health of clients with HIV/AIDS. One way that this may be done is through the

use of CAM such as guided imagery, progressive muscle relaxation, and perhaps therapeutic touch and other healing therapies.

**Oncology.** Bauer-Wu (2002) provides suggestions for oncological sensory therapy using psychoneuroimmunological reasoning. For instance, Bauer-Wu (2002) describes how smell involves direct communication to the limbic structures such as the hippocampus—the area controlling memory and emotion—via cranial nerve (CN) I. Therapy options include chamomile for nausea, pain, or anxiety or peppermint for nausea, fatigue, headaches, and indigestion; touch for inducing relaxation, improving circulation, providing pain relief, and promoting sleep as well as lymph drainage; etc. Effective categories of oncological interventions supported by PNI research include sensory (e.g. aromatherapy, music, massage), cognitive (e.g. guided imagery, autogenic training, cognitive restructuring and reframing), expressive (e.g. journaling, art therapy, music therapy), physical (e.g. yoga, t'ai chi, progressive muscle relaxation), or combination interventions (e.g. massage with aromatherapy and music, retreats, gardening, Bauer-Wu, 2002). Research into therapeutic options for oncology patients has vast implications and shows that independent nursing interventions such as massage or aromatherapy are effective in improving physical and mental health through psychoneuroimmunological mechanisms of action.

**Medical-Surgical and critical care.** McCarthy, Ouimet, and Daun (1992) report that auditory stressors reduce macrophage secretion of IL-1 and neutrophil release of superoxide anion in rats, impairing wound healing as these are crucial for neutrophil function and its healing properties (Zeller et al., 1996). Using interdisciplinary research findings, Caine (2003) and Lusk and Lash (2005) suggest the following interventions to assist with decreasing patients' stress levels and consequently improve immune functioning: the importance of a caring touch;

promoting patients' autonomy; encouraging and allowing family presence; individualizing environmental surroundings and levels of control; using appropriate and effective pain management; providing sufficient and uninterrupted time for rest and sleep; and utilizing nonpharmacological interventions such as biofeedback, visualization, imagery, and music therapy. However, Lusk and Lash (2005) warn that the "impact of stress-reduction therapies on immune function in ICU patients remains unexplored... While there is no current evidence that stress reduction among ICU patients will enhance the immune response, stress reduction strategies will psychologically support these critically ill patients," an equally important consideration (p. 27, 30). Nonetheless, nursing research reinforces the necessity of stress reduction to meet patients' holistic needs and promote a higher quality of life.

**Gerontology and end-of-life.** In terms of the psychoneuroimmunological impact on gerontology, Groer et al. (1994) found that their thirty-two elderly subjects had higher salivary IgA levels after receiving back massages, suggesting increased immune function through this CAM (Zeller et al., 1996). While looking at grieving, Houldin, McCorkle, and Lowery (1993) found that psychoneuroimmunological effects could be stronger than CAM. In their study, they found that nine widows had "selectively decreased immune function associated with higher levels of psychological distress" within two months of their spouses' passing despite having a four-week progressive muscle relaxation and guided imagery program (Zeller, 1996). Again research in these areas highlight the impact of CAM in lowering stress and improving immune functioning; however, Houldin et al.'s (1993) study is important in showing that the psychoneuroimmunological reactions to certain events cannot always be corrected completely through interventions.

### **Challenges to Research**

First and foremost, one struggle not simply for nursing research but for any research in the field of PNI is that not all of the underlying physiologic processes of PNI are known; with advances in technology, we have been able to understand more but the picture is not yet complete (Caine, 2005; McCain et al., 2005).

An additional concern is the Western-oriented roots of psychoneuroimmunology. As Bauer-Wu (2002) explains:

PNI is a biomedical model rooted in modern Western medicine explained by biochemical and physical mechanisms. Therefore, it is not inclusive of practices related to energy theory, spirituality, and Eastern medicine. For instance, the PNI framework does not explain integrative therapies, such as therapeutic touch, Reiki, acupuncture, acupressure, reflexology, and homeopathy. Additionally, PNI does not take into account the subtle but profound effects from the caring relationships that take place when people facilitate interventions for others (e.g., touch therapies, some sensory and cognitive therapies). Interpersonal connections invoke trust and peace of mind, leading to a calmer state with greater psychological and physical well-being (p. 3).

The general conclusion for many nursing interventions is based on the theory that if measures are taken to reduce patient stress, they will ultimately receive increased immune function, although little research has been conducted on the actual empirical effects of these psychosocial interventions on the immune system and disease progression (Caine, 2003; McCain et al., 2005; Lush & Lash, 2005; Langley et al., 2006). In other words, the effects of many nursing interventions may simply continue to be speculative at this point.

Part of the difficulty of conducting nursing research in psychoneuroimmunology is that not many nurses have biological science backgrounds; there is a need for pre-doctoral and post-doctoral nurse training programs with strong immunology and biological science foundations (Zeller et al., 1996, p. 662). One positive trend is that an increasing number of graduate nursing curriculums have specifically incorporated psychoneuroimmunology into their programs throughout the past decade.

Another major challenge is determining valid indicators of outcome efficiency during research. How to measure the variables systematically and empirically, let alone at all, is difficult. Additionally, “the interpretation of changes in the immune system that are unequivocally due to stress is difficult” as there are often multiple outside variables, not all of which may be controlled (Caine, 2003, p. 65).

Perhaps the greatest challenge nursing faces in conducting research on the topic of psychoneuroimmunology is the fact that PNI is such an interdisciplinary field. Combining elements of psychology, immunology, endocrinology, psychiatry, pharmacology, neurology, neuroscience, molecular biology, rheumatology, and behavioral medicine, PNI truly is a holistic paradigm and requires the collaboration of researchers with knowledge and expertise from across these fields. Explains Langley et al. (2006):

The methods used...are not easily available to nurse researchers, who are often conducting research within severe resource constraints... It is not normally part of nurses' remit to request such things as laboratory investigations, and this situation may result in nurses avoiding biochemical or laboratory measurements in their research, relying on more subjective measurements to validate the effect of their nursing intervention (p. 1128).



This in turn does not enforce the credibility of nursing practice. In order for successful nursing research to occur, there must be “active inter- and intradisciplinary collaborations, utilization of current knowledge in genetics, use of meaningful biomarkers, and a biobehavioral approach” (Briones, 2007, p. 249).

### **The Future of Psychoneuroimmunology in Nursing**

PNI has shown us that “biological and behavioral processes are tightly interwoven and both need to be considered when providing patient care” (Langley et al., 2006, p. 1128).

Immunosuppression is linked to grieving, depression, uncertainty surrounding illness, perceived loss of control, and lack of supports (McCain et al., 2005,). Effective coping strategies can lead to altering stress-related PNI responses and increase quality of life, physical health, and psychosocial functioning. This has vast implications as stress management interventions are not only effective at reducing psychological stress but the consequences of internal physiological stress; nurses play a key role in the education and promotion of stress management. CAM and nursing interventions such as exercise, hypnosis, and relaxation techniques have all been shown to boost immune and endocrine functioning (Briones, 2007; McCain et al., 2005).

Overall, research in the area of psychoneuroimmunology “has the potential to validate aspects of care that nurses have intuitively known to benefit their patients, as well as implement some complementary therapies into nursing practice” (Langley et al., 2006, p. 1126). However, this nursing research remains to be completed and the full implications of PNI are still unknown due to our currently incomplete knowledge of the interactions between the nervous, immune, and endocrine systems. Studies must also be conducted to determine the exact physiological mechanisms and outcomes of many psychosocial and nursing interventions.

**Psychoneuroimmunology: The Story Not Fully Written**

The mind-body narrative shows us the complex and rich interplay of the tales of philosophy, the social sciences, the natural sciences, theology, and the humanities and their collaborative effort in the creation of psychoneuroimmunology. As is evident, PNI has vast implications for not only medicine, but the profession of nursing as well by continual support of nursing's intuitive reasoning through empirical evidence and improving the patient response. Although much has been added to the narrative of mind-body medicine and PNI, there is no "end" in sight. As Harrington (2008) illuminates:

Mind-body medicine is a deeply storied world... The future of mind-body medicine should lie in its seeking, not finally to escape from its stories, but to embrace them as part of its map and part of its territory alike—inextricably part of, and fundamental to, what it is all about (pp. 254, 255).

In this sense, psychoneuroimmunology will continue the mind-body narrative, adding to interdisciplinary and intradisciplinary findings and implications.

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Zeller, J. M., McCain, N. L., & Swanson, B. (1996). Psychoneuroimmunology: An emerging framework for nursing research. *Journal of Advanced Nursing*, 23(4), 657-664. doi: 10.1111/j.1365-2648.1996.tb00034.x

## Appendix A

## Major Findings of Psychoneuroimmunology

- Spinal cord and brain function—i.e. the CNS—affect the efficiency of the immune response (Briones, 2007; Frankel et al., 2003).
- The immune system is able to be classically conditioned (Frankel et al., 2003; Harrington, 2008).
- The spleen, lymph nodes, bone marrow, and thymus' immunoresponsive tissues are all innervated by the CNS and are able to communicate via the production of signaling substances (Bakal, 1999; Briones, 2007; Frankel et al., 2003).
- Lymphocytes are able to chemically respond to as well as produce neurotransmitters and hormones (Bakal, 1999; Frankel et al., 2003; McCain et al., 2005).
- High cortisol levels—associated with a prolonged or chronically reactivated stress response—increases the number of T suppressor cells; inhibits natural killer cell production; decreases the number of interferon; decreases the efficiency of T helper cells; leads to atrophy of lymphoid tissues in the lymph nodes and thymus; decreases specific antibody production; decreases capillary permeability and inhibits chemotaxis; inhibits histamine and prostaglandin release; and promotes specific diseases and complications such as ulcers, hypertension, strokes, diabetes, myasthenia gravis, Parkinson's disease, heart attacks, cancer, arthritis, multiple sclerosis, and perhaps Alzheimer's, the mood disorders, and suicidality (Bakal, 1999; Frankel et al., 2003; Lusk & Lash, 2005; McCain et al., 2005).
- Negative emotions have disease-promoting abilities whereas positive emotions have health-promoting abilities via respectively decreasing or increasing immunocompetence (Bauer-Wu, 2002; Frankel et al., 2003; McCain et al., 2005).
- Stress and psychosocial factors—such as grieving or depression—impact immunity, making individuals more susceptible to autoimmune diseases, cancer, or infectious disease (Frankel et al., 2003; Harrington, 2008; Lusk & Lash, 2005; McCain et al., 2005; Zeller et al., 1996).

Appendix B

Thematic Timelines

Figure B1

*Philosophy Highlights*

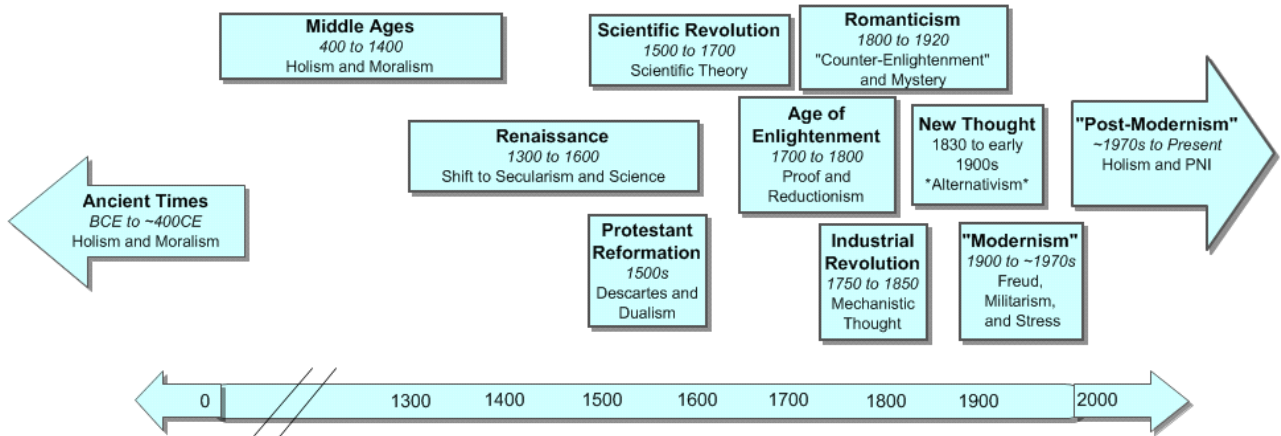


Figure B2

*Social Sciences Highlights*

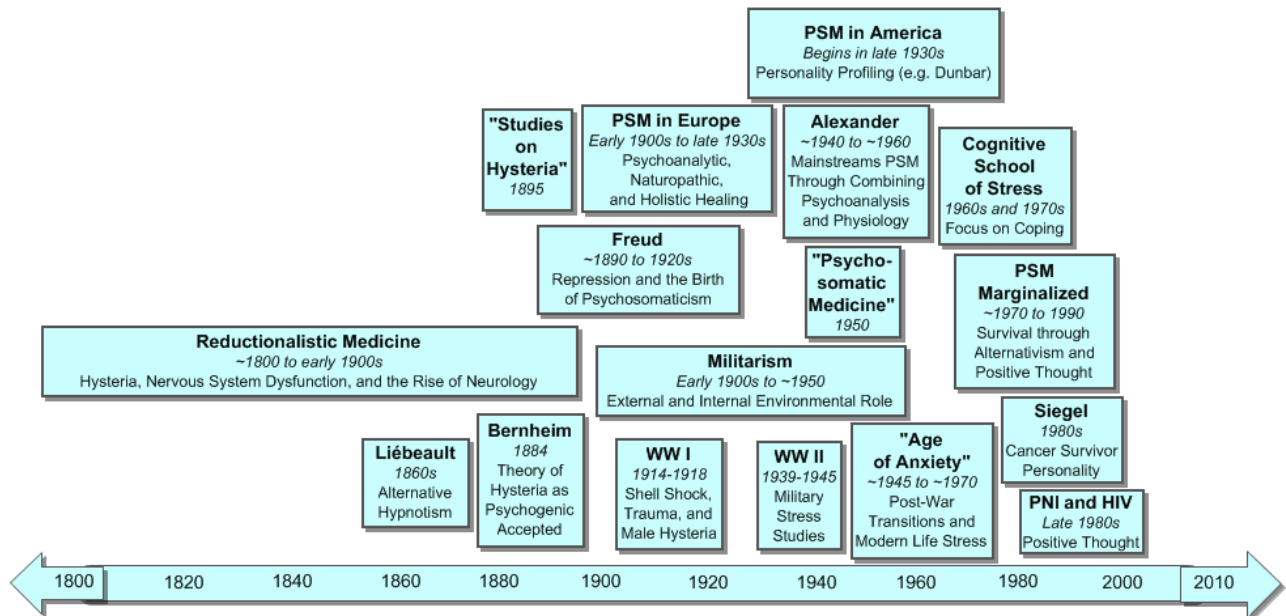




Figure B3

*Natural Sciences Highlights*

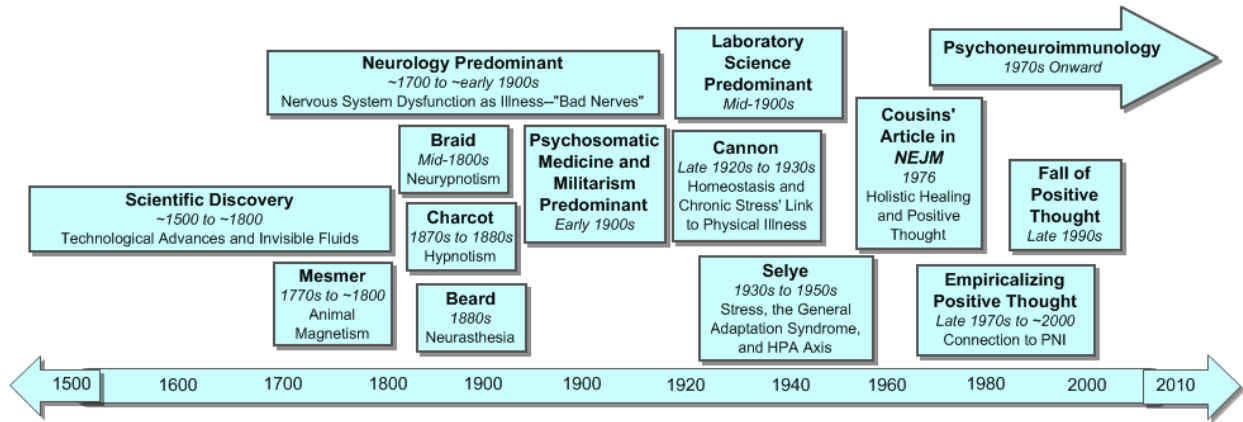


Figure B4

*Theology Highlights*

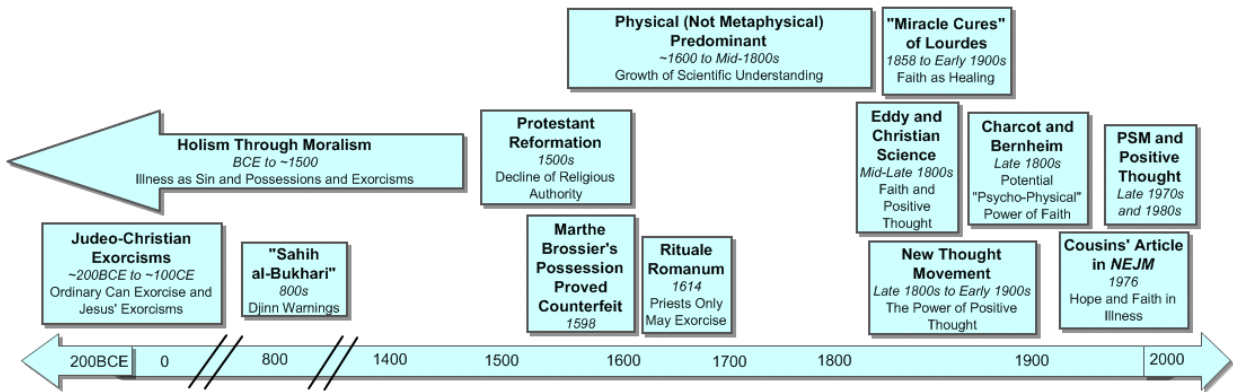
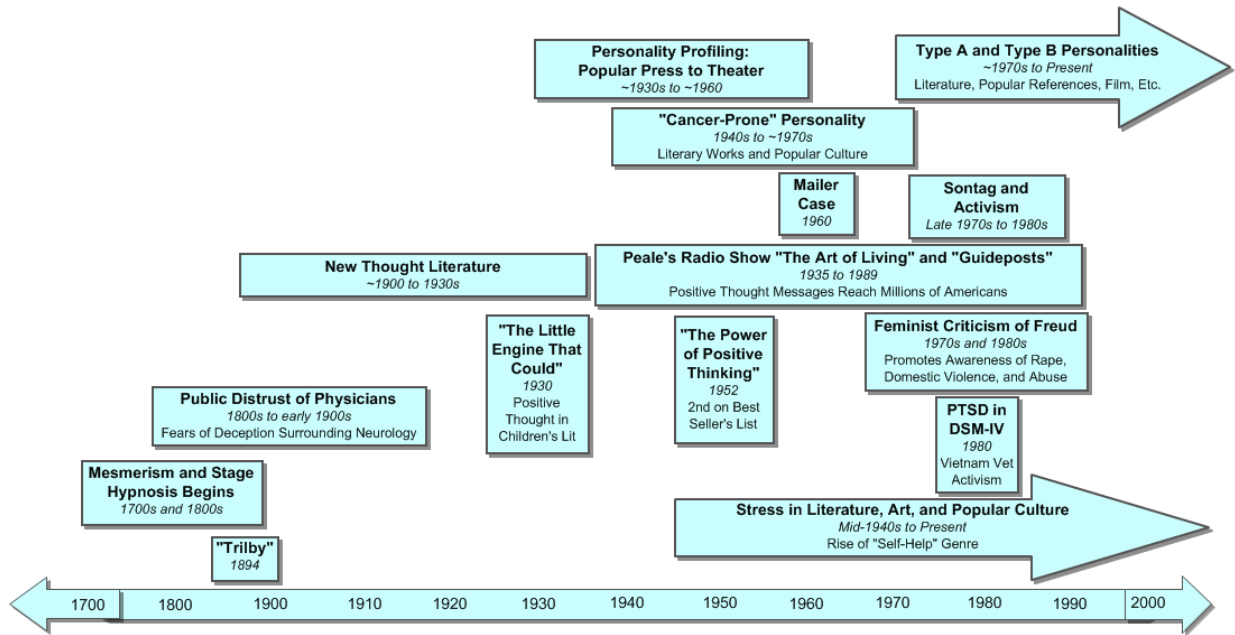


Figure B5

*Humanities Highlights*



## Appendix C

## Annotated Bibliographies of Nursing Research Studies Related to PNI

Bauer-Wu, S. M. (2002). Psychoneuroimmunology part II: Mind-body interventions. *Clinical Journal of Oncology Nursing*, 6(4), 1-4. doi: 10.1188/02.CJON.XXX-XXX

Bauer-Wu (2002) explores oncological integrative therapies using psychoneuroimmunology to explain the scientific rationale behind why these mind-body interventions are effective. Categories of interventions included sensory (e.g. aromatherapy, music, massage), cognitive (e.g. guided imagery, autogenic training, cognitive restructuring and reframing), expressive (e.g. journaling, art therapy, music therapy), physical (e.g. yoga, t'ai chi, progressive muscle relaxation), or combination interventions (e.g. massage with aromatherapy and music, retreats, gardening).

Caine, R. M. (2003). Psychological influences in critical care: Perspectives from psychoneuroimmunology. *Critical Care Nurse*, 23(2), 60-70. Retrieved from CINAHL database.

Caine (2003) presents an overview of the immune system and stress from a psychoneuroimmunological perspective before offering interventions for managing or alleviating stress within the critical care environment. Nursing interventions suggested by Caine (2003) include the following: encouraging hope; promoting patients' autonomy; using imagery, visualization, and biofeedback; sleep hygiene; music implementation; pain control measures; vitamin supplementation; and possible short-term psychotropic medication utilization.

Halldorsdottir, S. (2007). A psychoneuroimmunological view of the healing potential of professional caring in the face of human suffering. *International Journal For Human Caring*, 11(2), 32-39. Retrieved from CINAHL database.

Halldorsdottir (2007) first provides a foundation of psychoneuroimmunological understanding before qualitatively exploring professional caring in nursing in light of psychoneuroimmunology. Incorporated throughout the article are stories of former patients who have experienced either care or non-care on behalf of nursing staff. Through using PNI as a basis, Halldorsdottir (2007) concludes that patients must

experience three senses: a sense of connection, a sense of security, and a sense of control in order to perceive and ultimately experience healing.

Langley, P., Fonseca, J., & Iphofen, R. (2006). Holistic care: psychoneuroimmunology and health from a nursing perspective. *British Journal of Nursing, 15*(20), 1126-1129.

Retrieved from CINAHL database.

Langley, Fonseca, and Iphofen's (2006) article offers a brief overview of the underlying physiological mechanisms involved in psychoneuroimmunology as well as interdisciplinary findings from the field of PNI. The authors then discuss the importance of PNI research methodology in nursing research along with the difficulties PNI-nursing research imposes. Langley, Fonseca, and Iphofen (2006) conclude that PNI offers empirical support to nursing's long-standing focus of intuitive caring and the art of nursing.

Lusk, B., & Lash, A. (2005). The stress response, psychoneuroimmunology, and stress among ICU patients. *Dimensions of Critical Care Nursing, 24*(1), 25-31. Retrieved from

CINAHL database.

Lusk and Lash (2005) provide suggested interventions for ICU nurses in decreasing patients' stress levels as well improving patients' immune functioning. Various interventions include encouraging and allowing family presence, the importance of caring touch, providing sufficient and uninterrupted time for rest and sleep, providing patients with decision-making opportunities, and individualizing environmental surroundings and levels of control. While the authors report that no research has been conducted to establish that their interventions conclusively foster immune function, Lusk and Lash (2005) assert that these interventions are nonetheless vital for competent and holistic nursing care.

McCain, N., Gray, D., Walter, J., & Robins, J. (2005). Implementing a comprehensive approach to the study of health dynamics using the psychoneuroimmunology paradigm. *Advances In Nursing Science 28*(4), 320-332. Retrieved from CINAHL database.

McCain, Gray, Walter, & Robins (2005) make use of the psychoneuroimmunology paradigm to construct hypotheses and outcomes on the effectiveness of nursing interventions to improve coping and reduce stress in two patient populations: individuals infected with HIV and individuals in the early stages of breast cancer. The authors relay

the implications of PNI to nursing care, such as the importance of stress management in reducing distress as well as HIV progression in HIV-infected patients and the immunosuppressive mechanisms of stress further debilitating cancer patients.

Yamamoto, K. (2009). The effects of wrapped warm footbath on the autonomic nervous and psychoneuroimmunological activities in terminal cancer patients. *Oncology Nursing Forum*, 36(3), 37. Retrieved from CINAHL database.

Yamamoto's (2009) study was conducted to determine the effects of a wrapped warm footbath on the autonomic nervous and psychoneuroimmunological activities in terminal cancer patients. The subjects included the experimental group of nine patients who received a thirty minute foot bath and the control group of nine patients who received no therapy. Salivary cortisol and salivary secretory immunoglobulin levels were measured along with heart rate variability for physiologic responses, while a face scale and visual analogue scale were utilized for determining psychological responses. Yamamoto (2009) found that the salivary secretory immunoglobulin was significantly increased ( $p=0.05$ ), pain relief was evident ( $p=0.058$ ), and the face scale and visual analogue scale were significant in suggesting psychological relaxation ( $p=0.05$ ) for the subjects receiving the foot bath.

Zeller, J. M., McCain, N. L., & Swanson, B. (1996). Psychoneuroimmunology: An emerging framework for nursing research. *Journal of Advanced Nursing*, 23(4), 657-664. doi: 10.1111/j.1365-2648.1996.tb00034.x

Zeller, McCain, and Swanson (1996) provide a synthesis of eighteen initial nursing research studies in the field of psychoneuroimmunology. Of these studies, the focus of the majority of nursing research has been on HIV and quality of life issues as well as women's health issues such as childbearing or peri-menstruation conditions. Zeller, McCain, and Swanson (1996) assert the value of nursing research focused on the field of PNI as both disciplines concern holistic components of health. The authors maintain that patient care may be enhanced through further nursing research, particularly research on other at-risk populations for immunosuppression such as the elderly, cancer patients, and individuals suffering from chronic pain.

## Appendix D

## An Honorable Reflection

Everyone is familiar with the phrase “Insanity is doing the same thing over and over again and expecting different results”; however, in between being a nursing major, taking 16 credits per semester, having a work study job, and having family and other responsibilities *on top of* completing an intense and extensive Senior Honors Project, I realized that perhaps the definition of insanity could be extended to my life as well. I’m not going to lie and say that working on this rigorous project was always the highlight of my day or easy by any means; in fact, I truly believe that completing this project has been the most difficult experience of my undergraduate career (and if anyone is familiar with St. Kate’s nursing program they know this is saying something!). There have been numerous times throughout the past year—and particularly the past three months—that I have not only questioned my sanity but also my abilities and competence as a student and a writer. However, as a wholeheartedly ambitious (and obviously overachieving) individual, I found that my drive—along with numerous pep talks from family, friends, and my committee—allowed me to successfully complete this project. Today, on the day of my presentation as well as the day I will submit my finalized work to the Antonian Honors Scholars Program, I can honestly say that I truly feel an enormous sense of accomplishment in my “knowing my can” attitude (note: positive thought reference) and ability to complete this challenging undertaking.

Over a year ago, I began my Senior Honors Project knowing I wanted to do a project that combined my two passions—as well as my major and my minor—nursing and psychology. With my widespread interests, I found it difficult to settle on one specific topic but by the end of May I had decided upon exploring the fairly new discipline of psychoneuroimmunology. I

recalled a nursing professor briefly touching upon this topic in one of my classes my junior year and I was fascinated. Beginning my research, I was excited to learn about the complex interactions between the nervous, endocrine, and immune systems and the research linking these interactions to various states of health. Perhaps even more so, I was thrilled to discover the truly holistic nature of the field and being a strong advocate for holistic care, I was intrinsically drawn to a field which acknowledged the intimate relationship between the mind and the body and promoted whole-person wellness.

I began the project with the intention of focusing on nursing research stemming from PNI and the implications that could be drawn from this research; however, much to my disappointment I found nursing research on the subject to be very limited. Nevertheless, my project took a fortunate twist in early January as I became absorbed by the captivating history of mind-body medicine and my interest piqued in the historical interplay of prevailing thoughts of mind over body or body over mind. Realizing these historical perspectives would provide a rich foundation for my discussion of PNI—which is truly a culmination of mind-body medicine, I determined—along with my Project Chair—that this was a valuable path to explore and sought more data as well as drew sources from numerous undergraduate courses I had taken over the past four years.

By the middle of February I had my first 52 page draft complete, with the majority of the paper being an eclectic tale of the history of mind-body medicine. After receiving feedback, it was decided that I should attempt to identify and distinguish the various theoretical themes evident in this history, and I altered the first section of the paper to have a liberal arts foundation; this was an undertaking that proved not only extremely difficult and time-consuming but also extremely valuable to the organization and readability of the paper along with being essentially a

summary of my entire undergraduate career. With this lengthy background of mind-body medicine, PNI's evolution as well as nursing relationship with PNI became clearer and more profound.

Due to the highly interdisciplinary nature of PNI, nursing research on the topic remains limited but it has been exciting to see how the research that has been conducted in the past few decades has reinforced the efficacy of nursing interventions and provided significant “empirical knowing” to the profession of nursing. I hope to continue to stay informed on psychoneuroimmunological findings and even though I have spent approximately one year looking at the subject, it continues to fascinate and appeal to me. I would love to be able to participate in psychoneuroimmunological nursing research myself and perhaps someday during graduate school I will have this opportunity. I feel there are many findings and implications waiting to be discovered from PNI research, and I sincerely wish to be a part of this.

However, not everything is dependent on the need to pursue higher academics—that is, even now as an almost-new graduate nurse, I will have the opportunity to apply the knowledge I have gained from completing this Senior Honors Project to my practice. On the units in which I work, I can be mindful of the implications of PNI research in terms of the links between physical and psychological stress and physical and psychological illness and advocate for the holistic needs of patients through nursing interventions and alternative modalities of healing. I can also impact nursing practice as a whole by sharing the knowledge I have gained through this experience with other staff nurses and continuing to stay up-to-date (as well as keep others up-to-date) on psychoneuroimmunological findings. As I move on to the next stage of my life and begin my career as a new graduate, I am certain that I will continue to see the value of the



intellectually and personally challenging and rewarding experience that was the process of and completion of my Senior Honors Project.